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ABSTRACT

This bibliography of HumRRO publications has been compiled to provide as complete information as is feasible about that organization's research publications and products. The bibliography has been organized into three main parts, the first of which is the list of FY 1971 items. Part I also includes a supplementary listing of publications and presentations from earlier years that were issued in the HumRRO Professional Paper series during FY 1971. Part II is a cumulative listing of all material (except a few classified items) that has been published by HumRRO since its inception, including that published in FY 1971. Part III is a separate listing of research and development products and experimental materials. An appendix lists HumRRO reports in the numbered series according to both the current and earlier reporting categories, and papers in the numbered Professional Paper series. Three indexes are included: author, sponsor, and a key-word-out-of-context (KWOC) index. (Author/DB)

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Human Resources Research Organization Bibliography of Publications

As of 30 June 1971



Human Resources Research Organization

Bibliography of Publications

As of 30 June 1971



September 1971

HUMAN RESOURCES RESEARCH ORGANIZATION

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Requests for information concerning items in the Bibliography or other aspects of HumRRO work should be addressed to the Executive Office or to the Director of a research Division. The addresses are listed below.

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HUMAN RESOURCES RESEARCH ORGANIZATION
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FOREWORD

The Human Resources Research Organization is a nonprofit research and development corporation whose purpose is "to improve human performance, particularly in organizational settings, through behavioral and social science research, development, and consultation."

Toward this objective, HumRRO has done research and development work on a wide range of special training and innovations in training technology. Our work is done under contracts with various departments of the Federal Government, with state or local governments, or with organizations that are involved in education or training responsibilities. HumRRO was established in 1951, under The George Washington University, to carry out an integrated program of human resources research for the Department of the Army. Research was later undertaken for other agencies, and in 1969 HumRRO separated from the University.

The chief product of HumRRO work is information; thus, reporting the results of these research efforts is a major endeavor. The *HumRRO Bibliography of Publications As of 30 June 1971* has been compiled to provide a complete accumulation of information about HumRRO research reporting up to that time. It supersedes earlier HumRRO bibliographies.

Meredith P. Crawford
President
Human Resources Research Organization

DESCRIPTION OF THE BIBLIOGRAPHY

Purpose

The *HumRRO Bibliography of Publications, As of 30 June 1971*, has been compiled to provide as complete information as is feasible about HumRRO research publications and products. This information is intended for use by research and development personnel concerned with human factors problems, and operational personnel concerned with utilization of training and other research information and products. Researchers and users of research and development in the military services, other government agencies, and elsewhere concerned with training and other human factors research and development will find the Bibliography a useful aid. It supersedes the cumulative *HumRRO Bibliography of Publications As of 30 June 1969*, and the *Bibliography of Publications and Presentations During FY 70*.

Scope

The Bibliography has been designed to serve as many reference requirements as possible. The reporting items issued during FY 1971 are listed separately as well as in the cumulative total output, so that the user may either identify new materials available or look over the total publication list for research on a particular topic. In addition to HumRRO-published reports, FY 1971 and cumulative lists include professional publications and presentations by staff members. Abstracts have been provided for most items in the cumulative list. A comprehensive and descriptive listing of research products and experimental materials has been compiled. Author, sponsor, and key word indexes are included.

Information supplied includes AD numbers, indicating items available to qualified users through the Defense Documentation Center (DDC) and, if appropriate, through the National Technical Information Service, U.S. Department of Commerce. PB numbers are included as appropriate for items listed in DDC under the Publications Board code. Some items deposited in the Educational Resources Information Center (ERIC) are identified by ED numbers.

Sponsors for all research efforts reported in this Bibliography are identified, in parentheses, under the code name or short title.

Organization

The Bibliography has been organized into three main parts, the first of which is the list of FY 1971 items. The publications are listed chronologically under the research code name (Work Unit or Research Project) or under the type of research effort other than Work Unit or Research Project (Exploratory Research, Basic Research, Technical Advisory Service) to which they relate, or under a General section if they are not directly related to a specific research effort or are related to several efforts. Part I also includes a supplementary listing of publications and presentations from earlier years that were issued in the HumRRO Professional Paper series during FY 1971.

Part II is a cumulative listing of all material (except for a few classified items) that has been published by HumRRO since its inception, including that published in FY 1971. Part II is arranged in the same order as Part I. Work Units and Research Projects are listed alphabetically, by code name or short title. Exploratory Research and Basic Research Studies are listed sequentially by number, and Technical Advisory Service publications are arranged by date. Publications and presentations not specifically related to a single research effort, or those related to several efforts, are grouped chronologically under the General section.

Part III is a separate listing of research and development products and experimental materials. Included in this section are such items as documents, materiel, manuals, and other materials that may be suitable for adaptation for operational use. Products range from specific training programs and technical manuals to training items for new equipment. They are briefly described under the research code names or general category to which they relate; if they originate in or with a publication, it is cited.

An Appendix (A) lists HumRRO reports in the numbered series according to both the current and earlier reporting categories, and papers in the numbered Professional Paper series.

Three indexes are also included, an author index, a sponsor index, and a key-word-out-of-context (KWOC) index. The KWOC index contains bibliographic titles alphabetized on the basis of key words contained in the title. With this index the reader may locate items on topics that interest him by framing a question, extracting from it the key words, looking up the titles containing the key words or their synonyms, and using the reference code with the title to locate the citation in the Bibliography.

NOTES

Designations for the HumRRO divisions as of 30 June 1971 are used in the body of the Bibliography, without reference to name changes that have occurred over the years.

The publications of two divisions that are no longer operational are included: the Motivation, Morale, and Leadership Division, terminated in 1955, and the Psychological Warfare Division, terminated in 1956. Requests for information concerning publications of these divisions should be addressed to the Executive Office, HumRRO.

Military personnel assigned in support of a research effort occasionally appear as one of the authors of an item; no special note has been made where this is the case.

CONTENTS

	Section	Page
Part I: Publications and Presentations During FY 1971	A	3
Part II: Cumulative Listing of Publications and Presentations		15
Work Units and Research Projects	B	15
Exploratory Research	C	203
Basic Research Studies	D	213
Technical Advisory Service	E	223
General (Items Not Directly Related to Specific Research Elements or Items Related to Several Elements)	F	227
Part III: Research and Development Products and Experimental Materials		253
Appendix		
A Reports and Professional Papers by Number		279
Indexes		
Author Index		293
Sponsor Index		299
Key-Word-Out-Of-Context (KWOC) Index		300

**Part I: Publications and Presentations
During FY 1971**

WORK UNITS AND RESEARCH PROJECTS

APSTRAT (Division No. 3)

(Research for the Department of the Army)

"The Development of a Low-Cost Performance-Oriented Training Model," by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 32-70, 12 pp., December 1970. AD-722 273

"Utilization of Peer-Instruction in a Generalizable Performance-Oriented Training Model," by Kenneth Weingarten, paper for American Educational Research Association convention, New York City, February 1971.

The APSTRAT Instructional Model, by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, Professional Paper 6-71, 13 pp., May 1971. AD-725 567

AUTOSPAN (Division No. 7)

(Research for the Department of the Army)

Development and Evaluation of a Self-Instructional Spanish Course, by George H. Brown, Richard Beym, Thelma G. Smackey, and Angelo A. Cozzetto, Technical Report 70-14, 78 pp., September 1970 (AUTOSPAN II). AD-714 289 ED-044 996

AVTRAIN (Division No. 6)

(Research for the U.S. Coast Guard)

"Systems Engineering of Coast Guard Aviation Training," by Eugene R. Hall and Paul W. Caro, paper for Psychology in the Air Force Symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

CAMBCOM (Division No. 4)

(Research for the Department of the Army)

Knowledge and Skills Inventory: The Adjutant S-1, Combat Arms Maneuver Battalion, Research By-Product, 1970.

Knowledge and Skills Inventory: The Intelligence Officer S-2, Combat Arms Maneuver Battalion, Research By-Product, 1970.

Knowledge and Skills Inventory: The Operations/Training Officer S-3, Combat Arms Maneuver Battalion, Research By-Product, 1970.

Knowledge and Skills Inventory: The Logistics Officer S-4, Combat Arms Maneuver Battalion, Research By-Product, 1970

COPE (Division No. 7)
(Research for the Department of the Army)

"Development of a Technique for Creating 'Cultural Self-Awareness,'" by Alfred J. Kraemer, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

DRIVER EDUCATION (Division No. 1)
(Research for the Department of Transportation)

"The Development of Driver Education Objectives Through an Analysis of the Driving Task," by A. James McKnight and Bert B. Adams, paper for National Safety Congress, Chicago, October 1970; issued as Professional Paper 4-71, 14 pp., April 1971. PB 200 692

Driver Education Task Analysis, Volume I: Task Descriptions, by A. James McKnight and Bert B. Adams, (HumRRO Technical Report 70-103), U.S. Department of Transportation Technical Report HS 800 367, DOT Contract No. FH 11-7336, 356 pp., November 1970. PB-197 325

Driver Education Task Analysis, Volume II: Task Analysis Methods, by A. James McKnight and Bert B. Adams, (HumRRO Interim Report IR-D1-70-1), U.S. Department of Transportation Technical Report HS 800 368, DOT Contract No. FH 11-7336, 46 pp., November 1970. PB-197 688

Driver Education Task Analysis, Volume III: Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Technical Report 71-9), U.S. Department of Transportation Technical Report (in press), DOT Contract No. FH 11-7336, 351 pp., March 1971.

Driver Education Task Analysis, Volume IV: The Development of Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Interim Report IR-D1-71-1), Department of Transportation Technical Report (in press), DOT Contract No. 11-7336, 68 pp., March 1971.

"Needed—Goals for Driver Education," by A. James McKnight, in *Concepts*, vol. 4, no. 2, Spring—Summer 1971.

Educational Workshops (Division No. 5)
(Research for the River Rouge, Michigan School District)

Introducing Innovation in Instruction: In-Service Teacher Workshops in Classroom Management, by William H. Melching, Edward W. Frederickson, and Paul G. Whitmore, Technical Report 70-104, 45 pp., November 1970. AD-730 959 ED-048 098

"A Classroom Management Project," by Paul G. Whitmore, presentation to River Rouge Board of Education, January 1971.

"Report of In-Service Teacher Training Workshops in the Management of Classroom Behavior," by Paul G. Whitmore, Edward W. Frederickson, and William H. Melching, paper for American Educational Research Association convention, New York City, February 1971.

"Individualized Instruction," by Paul G. Whitmore, William H. Melching, and Edward W. Frederickson, paper for Michigan Meeting on Individualized Instruction, Lansing, Mich., April 1971.

"Inservice Training for a New Function for School Psychologists," by Edward W. Frederickson, William H. Melching, and Paul G. Whitmore, paper for Southwestern Psychological Association convention, San Antonio, Tex., April 1971.

Educational Workshops (Continued)

"Classroom Management," by Paul G. Whitmore, paper for Education Service Center Conference, El Paso, Tex., May 1971.

FORGE (Division No. 4)

(Research for the Department of the Army)

"Factors in Organizational Effectiveness," by Joseph A. Olmstead, paper for meeting of South-eastern Psychological Association, Miami, Fla., April 1971.

Leadership Actions as Evaluated by Experienced Company-Grade Officers, by Joseph A. Olmstead, Larry L. Lackey, and Harold E. Christensen, Technical Report 71-11, 37 pp., June 1971. AD-729 380

IMPACT (Division No. 1)

(Research for the Department of the Army) (see also NSF-IDM)

Project IMPACT—Computer-Administered Instruction: Description of the Hardware/Software Subsystem, by The IMPACT Staff, Technical Report 70-22, 56 pp., December 1970. AD-721 159 ED-047 528

JOBTEST (Division No. 2)

(Research for the Department of the Army)

Development of a Work Sample Criterion for General Vehicle Mechanic, by John D. Engel, Technical Report 70-11, 32 pp., July 1970 (JOBTEST I). AD-714 212

A Comparison of Correlated-Job and Work-Sample Measures for General Vehicle Repairman, by John D. Engel and Robert J. Rehder, Technical Report 70-16, 26 pp., October 1970 (JOBTEST II). AD-714 842

JOBTRAIN (Division No. 1)

(Research for the Department of the Army)

Development of a Training Program and Job Aids for Maintenance of Electronic Communication Equipment, by Richard M. Gebhard, Technical Report 70-19, 75 pp., December 1970 (JOBTRAIN IV). AD-718 025

LEADREVIEW (Division No. 4)

(Research for the Office of Naval Research)

Leadership and Exchange in Formal Organizations, by T.O. Jacobs, HumRRO Final Report to the Office of Naval Research, Group Psychology Programs, Contract No. N00014-70-C-0091, NR 171-118/9-4-69 (452), 353 pp., December 1970. AD-725 584

LISTEN (Division No. 3)
(Research for the Department of the Army)

"Factors Affecting Learning by Listening," by Thomas G. Sticht, paper for National Research Council Conference on Language Acquisition and Comprehension, Durham, N.C., April 1971.

LOWENTRY (Division No. 6)
(Research for the Department of the Army)

Survey of Factors Influencing Army Low Level Navigation, by Robert H. Wright and Warren P. Pauley, Technical Report 71-10, 118 pp., June 1971.

MANICON (Division No. 5)
(Research for the Department of the Army)

"Man in Control," by Harry L. Ammerman and William H. Melching, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970; issued as Professional Paper 7-71, under the title *Man in Control of Highly Automated Systems*, 14 pp., May 1971.

MAP (Division No. 7)
(Research for the Department of the Army)

Military Advisors and Counterparts in Korea: 2. A Study of Personal Traits and Role Behaviors, by Dean K. Froehlich, Technical Report 70-13, 101 pp., September 1970 (MAP II). AD-876 926

Military Advisors and Counterparts in Korea: 3. An Experimental Criterion of Proficiency, by Dean K. Froehlich, Technical Report 71-2, 110 pp., February 1971 (MAP II). AD-883 238

MARKSMAN (Division No. 4)
(Research for the Department of the Army)

An Experimental Review of Basic Combat Rifle Marksmanship: MARKSMAN, Phase 1, by James W. Dees, George J. Magner, and Michael R. McCluskey, Technical Report 71-4, 142 pp., March 1971. AD-722 394

MEDIA (Division No. 2)
(Research for the Department of the Army)

"Procedure Learning and Display Motion," by Ronald W. Spangenberg, paper for Association for Educational Communication Technology meeting, Philadelphia, March 1971. ED-047 537

NIGHTSIGHTS (Division No. 2)
(Research for the Department of the Army)

"Hardware Parameters Related to Operator Training Capabilities," by Harold P. Bishop, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970; issued as Professional Paper 9-71, 8 pp., June 1971.

Preliminary Lesson Plans for Operators of the Far Infrared Target Indicator (FIRTI), Surveillance Set Infrared AN/VAS-1(V), by William L. Warnick, Research By-Product, December 1970.

NSF-IDM (Division No. 1)

(Research for the National Science Foundation and the James McKeen Cattell Fund) (see also IMPACT)

"Theories and Strategies Related to Measurement in Individualized Instruction," by Robert J. Seidel, paper for American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 2-71, 15 pp., March 1971. AD-725 566

"Who Should Develop Instructional Materials for CAI?" by Robert J. Seidel, paper for Computers in Instruction Conference, University of California, Los Angeles, October 1970.

OC LEADER (Division No. 4)

(Research for the Department of the Army)

An Analysis of First-Tour Duty Positions for Infantry Officer Candidate Graduates, by James A. Caviness, Technical Report 70-15, 28 pp., October 1970. AD-714 463

PACE (Division No. 7)

(Research for the Air Force)

Army "New Standards" Personnel: Relationships Between Literacy Level and Indices of Military Performance, by Allan H. Fisher, Jr., (HumRRO Technical Report 71-6), Technical Report MD-TR-71-12 (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 30 pp., April 1971.

Army "New Standards" Personnel: Effect of Remedial Literacy Training on Performance in Military Service, by Allan H. Fisher, Jr., (HumRRO Technical Report 71-7), Technical Report MD-TR-71-13 (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 33 pp., April 1971.

PREP MPC (Division No. 3)

(Research for the Monterey Peninsula College)

"The PREP Program at Monterey Peninsula College," by Hilton M. Bialek, paper for American Association of Junior Colleges Convention, Washington, March 1971; issued as Professional Paper 10-71, 7 pp., June 1971.

REALISTIC (Division No. 3)

(Research for the Department of the Army)

"Project REALISTIC: Determining Literacy Demands of Jobs," by Thomas G. Sticht and Richard P. Kern, *Journal of Reading Behavior*, vol. 2, no. 2, Summer 1970; issued as Professional Paper 3-71, 22 pp., April 1971.

Literacy Demands of Publications in Selected Military Occupational Specialties, by Thomas G. Sticht, Professional Paper 25-70, 20 pp., October 1970. ED-044 615 AD-715 640

"Effects of Speech Rate, Selection Difficulty, Association Strength and Mental Aptitude on Learning by Listening," by Thomas G. Sticht and Douglas R. Glasnapp, paper for American Educational Research Association meeting, New York City, February 1971.

"Project REALISTIC: Identifying Vocational Literacy Requirements as Targeted Skill Levels for Adult Basic Education," by Thomas G. Sticht and John S. Caylor, paper for Adult Educational Research Conference, New York City February 1971.

REALISTIC (Continued)

Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, by Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, and John S. Caylor, Technical Report 71-1, 82 pp., February 1971. AD-722 392 (see also UTILITY)

Learning by Listening in Relation to Aptitude, Reading, and Rate-Controlled Speech: Additional Studies, by Thomas C. Sticht, Technical Report 71-5, 45 pp., April 1971. AD-722 480

RELAY (Division No. 7) (Research for the Air Force)

A Descriptive Analysis of the Classification, Assignment, and Separation Systems of the Armed Services, by Francis D. Harding and John A. Richards, Phase 1 of Contract Number F 41609-70-C-0037, (HumRRO Technical Report 71-8), Technical Report AFHRL-TR-71-15, (in press), Manpower Development Program Office, Air Force Human Resources Laboratory, Air Force Systems Command, 39 pp., May 1971.

ROTOR (Division No. 6) (Research for the Department of the Army)

Functional Requirements for Ground-Based Trainers: Helicopter Response Characteristics, by W.G. Matheny and L.E. Wilkerson, Technical Report 70-17, 115 pp., October 1970 (ROTOR I). (Subcontractor: Life Sciences, Inc.) AD-714 954

Analysis of Visual Discrimination in Helicopter Control, by J.R. Thielges and W.G. Matheny, Technical Report 71-13, 159 pp., June 1971 (ROTOR I). (Subcontractor: Life Sciences, Inc.)

School Bus Safety (Division No. 1) (Research for the Department of Transportation)

The Selection and Training of School Bus Drivers, by A. James McKnight, Carolyn M. McClelland, and Mary E. Berry, (HumRRO Technical Report 71-3), Department of Transportation Technical Report, DOT Contract FH 11-7339, 251 pp., February 1971.

SIAF (Division No. 4) (Research for the Advanced Research Projects Agency)

Selection and Training for Small Independent Action Forces: System Analysis and Development of Early Training, by Joseph A. Olmstead and Theodore R. Powers, HumRRO Technical Report 70-102, U.S. Army Missile Command Advanced Research Projects Agency Contract Nr. DAAH01-70-C-0488, 43 pp., September 1970. AD-875 453

SIMULATE (Division No. 2) (Research for the Department of the Army)

Combat Job Requirements for Principal Staff Personnel: Division, Brigade, and Battalion, by Robert A. Baker, Technical Report 70-23, 134 pp., December 1970 (SIMULATE II). AD-722 248

SKYFIRE (Division No. 5)
(Research for the Department of the Army)

Aircraft Recognition Performance of Crew Chiefs With and Without Forward Observers, by Robert D. Baldwin, Edward W. Frederickson, and Edward C. Hackerson, Technical Report 70-12, 32 pp., August 1970. AD-714 213

SKYGUARD (Division No. 5)
(Research for the Department of the Army)

"Work Unit SKYGUARD: Air Defense Officer Course," by Paul G. Whitmore and Harry L. Ammerman, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

SPECTRUM (Division No. 3)
(Research for the Department of the Army)

"The Interrelationships of Ability Level, Instructional System, and Skill Acquisition," by John E. Taylor, Ernest K. Montague, and Robert Hauke, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 29-70, 8 pp., December 1970. AD-717 256

SYNTRAIN (Division No. 6)
(Research for the Department of the Army)

Device-Task Fidelity and Transfer of Training: Aircraft Cockpit Procedures Training, by Wallace W. Prophet and H. Alton Boyd, Technical Report 70-10, 49 pp., July 1970 (SYNTRAIN II). AD-713 433 ED-047 264

"Some Considerations for the Design of Aircraft Simulators for Training," by Paul W. Caro and Wallace W. Prophet, paper for Psychology in the Air Force symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

"An Innovative Instrument Flight Training Program," by Paul W. Caro, paper for Society of Automotive Engineers meeting, Atlanta, Ga., May 1971.

TRAINMAN (Division No. 2)
(Research for the Department of the Army)

"An Approach to the Development of Synthetic Performance Tests for Use in Training Evaluation," by William C. Osborn, paper for 12th Annual Military Testing Association Conference, French Lick, Ind., September 1970; issued as Professional Paper 30-70, 9 pp., December 1970. AD-719 265

UTILITY (Division No. 3)
(Research for the Department of the Army)

"Performance in Four Jobs: The Role of Mental Ability and Experience," by Robert Vineberg and Elaine N. Taylor, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 31-70, 17 pp., December 1970. AD-722 272

UTILITY (Continued)

"Marginal Manpower: Job Capability as a Joint Function of Aptitude and Experience," by Elaine N. Taylor and Robert Vineberg, paper for 26th Military Operations Research Symposium, Monterey, Calif., November 1970.

Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels: 1. Purpose and Design of Study, by Robert Vineberg, Elaine N. Taylor, and John S. Caylor, Technical Report 70-18, 38 pp., November 1970. AD-715 641

Performance in Five Army Jobs by Men at Different Aptitude (AFQT) Levels: 2. Development and Descriptions of Instruments, by Robert Vineberg, Elaine N. Taylor, and Thomas G. Sticht, Technical Report 70-20, 284 pp., November 1970.

Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, by Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, and John S. Caylor, Technical Report 71-1, 83 pp., February 1971. AD-722 392 (see also REALISTIC)

VOC TAX (Division No. 3)

(Research for the Office of Education, Department of Health, Education, and Welfare)

The Design and Evaluation of Vocational Technical Education Curricula Through Functional Job Analysis, by Kan Yagi, Hilton M. Bialek, John E. Taylor, and Marcia Garman, Final Report to Sponsor, August 1968, ERIC number ED 023 913; published as HumRRO Technical Report 71-15, 86 pp., June 1971.

Exploratory Research (Research for the Department of the Army)

Exploratory Research 72 (Division No. 1)

Analyses of U.S. Army Accident Data, by Clifford P. Hahn, Technical Report 71-14, 68 pp., June 1971. (Subcontractor: American Institutes for Research) AD-730 881

Basic Research Studies (Research for the Department of the Army)

Basic Research 14 (Division No. 2)

Prompting and Guessing in Tank Identification, by Elmo E. Miller, Technical Report 70-21, 25 pp., December 1970. AD-720 892

Comparison of Pictorial Techniques for Guiding Performance During Training, by Elmo E. Miller, Technical Report 71-12, 37 pp., June 1971.

Basic Research 16 (Division No. 5)

Shape Perception Judgments as a Function of Stimulus Orientation, Stimulus Background, and Perceptual Style, by Edward W. Frederickson, Technical Report 70-24, 66 pp., December 1970. AD-722 479

Technical Advisory Service

"Implementation of Systems Engineering Concepts in Army Training," by Darwin S. Ricketson, Robert H. Wright, and Russel E. Schulz, paper for 11th Institute of Electrical and Electronics Engineers Symposium on Man-Machine Systems, Winter Park, Fla., November 1970; issued as Professional Paper 11-71, 13 pp., June 1971. (Div. 6)

A Study Manual for the Drill Sergeant Candidate, Research Product, January 1971. (Div. 2)

General¹

"Do Personality and Social Psychologists Study Men More Than Women?" by Douglas S. Holmes and Bruce W. Jorgensen, *Representative Research in Social Psychology*, Spring 1970, issued as Professional Paper 8-71, 7 pp., June 1971. (Div. 4)

HumRRO Research on Officer Training, briefings at Headquarters, U.S. Continental Army Command, Fort Monroe, Va., July 1970; issued as Professional Paper 24-70, 44 pp., September 1970. (Exec. Off.) AD-714 211

"HumRRO Research on Officer Training and Education: The Leader, the Manager, the Technical Specialist," by William A. McClelland, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970. (Exec. Off.)

"Overview and Summary of Work Units OC LEADER, CAMBCOM, FORGE, and INGROUP," by T.O. Jacobs, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970. (Div. 4)

"The Military Mind Probes Tomorrow's Corporate Leaders," by Joseph A. Olmstead, *Business Management*, vol. 39, no. 5, February 1971.

"HumRRO Research and Project 100,000," by Howard H. McFann, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 33-70, 7 pp., December 1970. (Div. 3) AD-722 274

"A Military-Industrial Perspective on Psychotechnology Today and Ten Years Hence," by W.A. McClelland, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970. (Exec. Off.)

"Command and Control in the Army's Human Factor System," by Donald F. Haggard, paper for 16th Annual Human Factors Research and Development Conference, Fort Bliss, Tex., October 1970. (Div. 2)

¹ Items in this section either are not directly related to specific elements of the research program, or are related to several elements.

"A Framework for Viewing Quality Control in Training," by Eugene A. Cogan, Arthur J. Hoehn, and Robert G. Smith, Jr., *Educational Technology*, vol. 10, no. 11, November 1970; issued as Professional Paper 28-70, November 1970. (Exec. Off.) AD-720 003

"The Human Resources Research Organization's Aviation Psychology Research Program: Past, Present, and Future," by Wallace W. Prophet and Paul W. Caro, paper for Psychology in the Air Force Symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971. (Div. 6)

"The Media Manufacturer and the Educator," by Robert G. Smith, Jr., in *To Improve Learning, An Evaluation of Instructional Technology*, Academy for Educational Development, Inc., 1971; issued as Professional Paper 13-71, 12 pp., June 1971.

"Systems Analysis and the Introduction of Educational Technology in Schools," by Eugene A. Cogan, in *To Improve Learning, An Evaluation of Educational Technology*, Academy for Educational Development, Inc., 1971; issued as Professional Paper 14-71, 16 pp., June 1971.

In addition to the preceding items that were published or presented during FY 1971 for the first time, a number of presentations and articles listed in the Bibliography in previous years were published during FY 1971 in the form of HumRRO Professional Papers. This was done to make these items more readily available, in view of their continuing interest and relevance to research or operations.

The Application of Theoretical Factors in Teaching Problem-Solving by Programed Instruction, Professional Paper 23-70, August 1970; previously listed as abbreviated version of Technical Report 68-4, April 1968, by Robert J. Seidel and Harold G. Hunter; in *International Review of Applied Psychology*, vol. 19, no. 1, April 1970. (Div. 1) (see METHOD) AD-715 569 ED-047 525

"An Approach to Standardizing Human Performance Assessment, by John D. Engel, Professional Paper 26-70, 12 pp., October 1970; previously listed as paper for THEMIS conference, Texas Technological University, Lubbock, Tex., March 1970. (Div. 2) (see JOBTST) AD-717 258

Collected Papers Prepared Under Work Unit REPAIR: Training of Electronics Maintenance Personnel, Presentations and Papers, 1957-1960, Professional Paper 27-70, 39 pp., November 1970. (Div. 1) (see REPAIR) AD-717 257

Collected Papers Prepared Under Work Unit TEXTRUCT: Methods of Instruction in Technical Training, Presentations and Papers, 1958-64, Professional Paper 34-70, 96 pp., December 1970. (Div. 5) (see TEXTRUCT) AD-722 128

Peer Ratings as Predictors of Success in Military Aviation, by James L. Wahlberg, Wiley R. Boyles, and H. Alton Boyd, Professional Paper 1-71, 17 pp., March 1971; previously listed as paper for annual meeting of Alabama Psychological Association, Destin, Fla., May 1970. (Div. 6) AD-724 695 (see PREDICT)

Prediction of Army Aviator Performance: Description of a Developing System, by Wiley R. Boyles and James L. Wahlberg, Professional Paper 5-71, 12 pp., April 1971; previously listed as paper for annual meeting of Alabama Psychological Association, Destin, Fla., May 1970. (Div. 6) (see PREDICT) AD-724 696

Training Strategies and Individual Differences, by Howard H. McFann, Professional Paper 12-71, 16 pp., June 1971; previously listed as paper for Adult Basic Education Research Conference, University of Chicago, March 1969.

"The Process of Developing and Improving Course Content for Military Technical Training," by Harold G. Hunter, J. Daniel Lyons, Eugene F. MacCaslin, Robert G. Smith, Jr., and Harold Wagner, *Educational Technology*, April 1970 and May 1971; issued as Professional Paper 15-71, 14 pp., June 1971; previously listed, in unabbreviated form, as Technical Report 69-9, 72 pp., May 1969.

Part II: Cumulative Listing of Publications and Presentations

WORK UNITS AND RESEARCH PROJECTS

AAA—Division No. 3

Factors Affecting Efficiency and Morale in Antiaircraft¹ Artillery Batteries (Research for the Department of the Army)

"Battery Effectiveness: Assessment of Comparative Performance," by Francis H. Palmer and Thomas I. Myers, *Antiaircraft Journal*, November-December 1954.

*This article describes the development of realistic measures to identify highly efficient and less efficient antiaircraft batteries and discusses the extent to which the several measures of performance are related. Under specific discussion are range of radar pickup, firing range scores, radar maintenance, artillery maintenance, defense commander's rating, and adverse personnel actions.

"Crew Description Dimensions and Radar Crew Effectiveness," by Thomas I. Meyers and Francis H. Palmer, paper for American Psychological Association convention, September 1955.

*This paper presents results pertaining to the group dimensions variables Harmony, Intimacy, Procedural Clarity, and Stratification of the Ohio State University's Crew Dimensions Description Questionnaire. It was shown that the four CDDQ scales are generally reliable; that with one exception the dimensions were empirically independent; and that leader and follower agreement was high on Procedural Clarity and Stratification but not on Harmony and Intimacy. The leader's stratification rating of the crew correlated highly with group effectiveness.

"Sociometric Choices and Group Productivity Among Radar Crews," by Francis H. Palmer and Thomas I. Myers, paper for American Psychological Association convention, September 1955.

*Radar crews of 8 to 13 men, from 40 antiaircraft batteries, were studied. Each crew consisted of three status individuals and subordinate members whose primary roles were operation of the equipment. The complex team process of identifying, acquiring, and locking-on an aerial target is the crucial point in battery effectiveness. The measure of productivity was the average range of pickup for each of the 40 crews over a three-month period of locking-on targets during 104 air strikes. Sociometric scores determined for each unit were a total score, a score for status individuals, and a score for subordinates. As measured in this study, social interaction was negatively related to group productivity.

"Human Factors Affecting the Performance of Antiaircraft Batteries," by Francis Palmer, Thomas Myers, Bertram Gold, and Paul Metzger, summary task paper, March 1956.

*Operational performance in Range of Radar Pickup and Radar Maintenance measures by antiaircraft batteries and the Defense Commander's Rating practices in 40 on-site defense organizations were studied. Leadership techniques, battery practices, and interpersonal relationships were studied to determine the extent to which human factors served to discriminate between high and low efficiency units. Implications for personnel assignment and for training are given.

"Leadership and Group Achievement," by Francis H. Palmer, *Adult Leadership*, vol. 5, no. 2, June 1956.

*This article discusses research on leadership and leader training as related to multiple group goals and performance in the achievement of those goals. Although relating research in a military setting, some implications for nonmilitary contexts are included.

¹ A star at the beginning of the abstract indicates that the item is one of the AAA papers or presentations included in *Collected Papers Prepared Under Work Unit AAA: Factors Affecting Efficiency and Morale in Antiaircraft Artillery Batteries*, Professional Paper 33-69, November 1969.

AAA (Cont.)

Collected Papers Prepared Under Work Unit AAA: Factors Affecting Efficiency and Morale in Antiaircraft Artillery Batteries, Professional Paper 33-69, 41 pp., November 1969. AD-699 490

(AAA items included in this Professional Paper are indicated with a star in the left margin of the abstract.)

Research conducted in 1954-55 to determine the contribution of certain human factors to the effective performance of crew members of antiaircraft artillery batteries is described in this series of papers. The collection includes two presentations at professional meetings, two professional journal articles, and a task paper summarizing the research program.

ACCIDENT—Motivation, Morale, and Leadership Division

**Studies of Morale and Motivation Factors Influencing Effectiveness of Individual Soldiers:
Off-Duty Driver Accidents
(Research for the Department of the Army)**

Army Accident Reporting: Results of Some Exploratory Interviews, by Berton Winograd, interim report, September 1954. AD-488 404

Safety personnel at eight Army installations were interviewed in 1954 to determine the reasons for inaccuracies in accident reports received by the Safety Branch, Department of the Army. While reporting completeness varied among the installations, it was found that serious accidents were generally reported more fully than trivial accidents; that the usefulness of reports is adversely affected by supervisors who desire to protect their men from punishment and to protect their safety records; and that safety directors encounter indirect pressures from military commanders to under-enumerate accidents. Reports were more complete from installations where civilian personnel outnumbered military personnel.

ACHILLES—Division No. 5

An Evaluation of the Maintenance Proficiency of Fire Control System Technicians (Research for the Department of the Army)

"On the Relationship Between Electronics Maintenance Proficiency and the Retention of Theory Oriented Electronic Information," by P.G. Whitmore, Jr., and W.L. Williams, Jr., paper for American Psychological Association convention, Washington, 1958.

A job sample performance test and a written test covering the Nike-Ajax IFC technicians' course were administered to 91 technicians immediately after graduation and to 98 with experience beyond graduation. Performance test scores increased as experience increased while written (theory oriented) test scores decreased. This decrease and the low correlations between written and performance test scores (for both groups) suggest that a portion of course content is irrelevant to the job. A drop in the electronic aptitude-maintenance proficiency correlation from the inexperienced to the experienced group suggests the need for job validated rather than training validated aptitude measures.

The Development and Use of a Performance Test as a Basis for Comparing Technicians With and Without Field Experience: The NIKE AJAX IFC Maintenance Technician, by W.L. Williams, Jr., and Paul G. Whitmore, Jr., Technical Report 52, January 1959. PB-139666 AD-212 663

To evaluate technical training courses given Nike-Ajax IFC maintenance technicians, two tests were developed: (a) a performance test, including troubleshooting and adjustment operations on a Nike-Ajax IFC system, and removal and replacement of a soldered-in component; (b) a written test, measuring retention of knowledges acquired by the technicians during school training. The tests were administered to 91 inexperienced and 18 package-trained technicians, and to 98 technicians with field experience (average, 19 months). The groups were compared on performance and on knowledge retained, using the inexperienced group's scores as baselines. With more field experience, performance scores increased and written scores decreased. The written and performance total scores and subscores showed little relationship, although the subtests of each test were highly interrelated. Most technicians at all experience levels failed to use good soldering techniques.

A General Note on the Development and Use of Job Performance Tests and a Detailed Description of Performance Tests for NIKE IFC Technicians, by W.L. Williams, Jr., and Paul G. Whitmore, Jr., Research Memorandum, March 1959. AD-478 735

The development and utilization of performance tests within the context of technical training, and the content and administrative procedures of a series of performance tests developed for Nike IFC maintenance technicians are described.

Research By-Products resulting from this research effort are listed in Part III.

ACROSS-RETURN—Psychological Warfare Division

Evaluation of Effects of Intercultural Contact Between U.S. Army Personnel and Their Dependents and Foreign Nationals (Research for the Department of the Army)

Some Effects of Overseas Duty on the Attitudes of American Troops Toward Host Populations, by Milton Jacobs and Louis Schatz, Staff Memorandum, June 1954. AD-480 317

A preliminary study of the attitudes of American troops stationed abroad and residents of their host countries was made by interviewing troops several times during their foreign stay and again just before departure. It was found that favorable attitudes related positively to the amount and intimacy of contact with the host population, and that preconceptions were related to attitude change. Personal background of the troops was found not to be related to attitudes and attitude change.

ACTION—Division No. 4

**Research for Improvement of Infantry Stability Operations Training
(Research for the Department of the Army)**

"A Second Look at Vietnam," by LTC George J. Magner (USA Ret.), *Infantry*, vol. 59, no. 3, May-June 1967.

ADCIVA—Motivation, Morale, and Leadership Division

**Studies of Psychological Adjustment to the Requirements of Military Life: Factors in Recruits' Adjustment
(Research for the Department of the Army)**

An Experimental Study of Modifications in Factors Influencing Recruits' Adjustment to the Army, by Richard Christie, Richard Maisel, Wallace Mandell, Irving A. Taylor, and Harold E. Yuker, Subcontractor's report, 1954 (Subcontractor: Research Center for Human Relations, New York University). AD-479 345

Transition From Civilian to Army Life, by Richard Christie, summarized by H.G. Osburn, Technical Report 13, October 1954 (Subcontractor: Research Center for Human Relations, New York University). PB-116803 AD-58 040

A group of 555 men was chosen at random from among inductees at Fort Dix to study whether the success of transition from civilian to Army life is influenced by (a) reduced contact with family and civilian friends, (b) assignment to squads of high cohesiveness, (c) participation in positions of responsibility and leadership, and (d) instruction in techniques of adjustment to Army life. The results of the study confirm the hypothesis that (for single men) training far from home increases likelihood of successful adjustment to Army life. Hypotheses concerning the other three factors were not confirmed.

ANSCALE—Division No. 1 (System Operations)

**Development of an Anxiety Scale for Use in Army Training Research
(Research for the Department of the Army)**

Anxiety Scales for Use in Army Training Research, by Joseph C. Hammock, Staff Memorandum, June 1954. AD-480 314

The adaption for military use of two forms of the A-Scale—the original true-false version of the Taylor Anxiety Scale, and a forced-choice modification constructed by Heineman—is described, and the procedure used in adapting them is presented. Data are then provided concerning some characteristics of the new scales, including norms for a basic training sample and reliability and “susceptibility to biased responding” for groups of different general aptitude. Copies of the revised scales are included.

APSTRAT—Division No. 3

**Training Strategies and Incentives Appropriate to Different Aptitude Levels for Selected Army Training Courses
(Research for the Department of the Army)**

“Functional Context Training in an Operational System,” by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, Brent Allred, and Martin Pollyea, briefing for Department of Defense Manpower Research Planning Group, Washington, October 1969; issued as Professional Paper 8-70, 12 pp., March 1970. AD-706 337

This paper describes the work plan for the development of a complete training model suitable for multi-aptitude training populations and stressing individualized, self-paced learning in an operational functional context. Progress through the curriculum is determined by proficiency in task performance. The training model generates novel management problems and provides for techniques for their solution.

“The Development of a Low-Cost Performance-Oriented Training Model,” by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, paper for symposium at American Psychological Association convention, Miami Beach, Fla., September 1970; issued as Professional Paper 32-70, 12 pp., December 1970.

This paper describes a training model featuring peer instruction in a functional job-simulated context, as well as the objectives and practical constraints that led to its development.

“Utilization of Peer-Instruction in a Generalizable Performance-Oriented Training Model,” by Kenneth Weingarten, paper for American Educational Research Association convention, New York City, February 1971.

The APSTRAT Instructional Model, by Kenneth Weingarten, Jacklyn Hungerland, Mark Brennan, and Brent Allred, Professional Paper 6-71, 13 pp., May 1971. AD-725 567

This paper describes a low-cost instructional model suitable for multi-aptitude training populations, stressing individualized, self-paced learning in an operational functional context and utilization of peer instruction. The model, developed in pilot studies involving the Army's Field Wireman Course (MOS 36K), is designed as a generalizable instructional system.

APTITUDE—Division No. 2

Basic Training Achievement in Infantry Squads With Controlled Aptitude (Research for the Department of the Army)

Training Achievement in Basic Combat Squads With Controlled Aptitude, by Donald C. Findlay, Seymour M. Matyas, and Hermann Rogge III, Technical Report 16, January 1955. PB-118877 AD-73 777

This study was designed to test (a) a method of raising the performance of basic trainees of below average intelligence, and (b) a method of raising the motivation-to-learn of trainees of all aptitudes. Low-aptitude men appeared not to benefit from training with high-aptitude men; their performance varied little, regardless of the number of high-aptitude men in the squad. However, squad competition and rewards decidedly increased the motivation-to-learn of trainees of all aptitudes, bringing low-aptitude men above the proficiency of average men in squads lacking incentive.

"Ability Grouping in Army Basic Combat Training," by Donald C. Findlay, Seymour M. Matyas, and Hermann Rogge III, *Journal of Applied Psychology*, vol. 40, no. 6, December 1956.

This study investigated the effectiveness of heterogeneous ability grouping as a method of increasing proficiency in Army Basic Combat Training. In each of two companies, low-ability trainees were trained under three conditions of ability grouping. One group of low-ability men trained in squads containing only low-ability men (low), one group in squads containing high- and medium-ability men also (low-medium-high), and one group in squads containing high men also (low-high). In spite of a system of competition that made privileges dependent on squad performance, a proficiency test given at the end of eight weeks of training failed to show a significant difference between the learning of low-ability men who had high-aptitude men in their squads and those who did not. Achievement at all ability levels was unusually high, but low men who were trained in squads by themselves were just as proficient as low men who were trained in squads with higher ability men.

AREA—Division No. 7 (Social Science)

Development of Concepts and Techniques for Area Training (Research for the Department of the Army).

Cross-Cultural Problems of U.S. Army Personnel in Laos and Their Implications for Area Training, by Alfred J. Kraemer and Edward C. Stewart, Research Memorandum, 20 pp., September 1964 (For Official Use Only)(AREA I). AD-450 364

"American Advisors Overseas," by Edward C. Stewart, *Military Review*, vol. XLV, no. 2, February 1965. AD-623 040

Examples of Cross-Cultural Problems Encountered by Americans Working Overseas: An Instructor's Handbook, by Robert J. Foster, 111 pp., May 1965 (AREA I). AD-465 043

This handbook is designed to aid instructors in area training programs to give meaning and impact to their lectures by presenting real-life examples drawn from published and unpublished sources such as textbooks, case studies, and interviews. The examples are classified into seven categories of cross-cultural problems, and as an additional breakdown, cross-indexed by technical specialty, geographic location, and American values critical to effectiveness overseas. An extensive list of references is included to provide additional source and background material as well as to enable the reader to examine an illustration in context. For ease of handling and rearranging, the examples are printed for cutting into 5 x 7 cards.

AREA (Cont.)

"Simulation Exercises in Area Training," by Edward C. Stewart, paper for 11th Annual Army Human Factors Research and Development Conference, Fort Bragg, N.C., October 1965; issued as Professional Paper 39-67, 14 pp., September 1967. AD-660 012 ED-016 938

Special techniques and content are being developed to supplement current area training programs. Simulation was chosen as the technique, and exercises were developed whose content emphasized the American culture and the foreign, host culture. These evolved as a confrontation between American cultural assumptions and values and a contrasting set, conceived for training and research purposes only, called contrast-American assumptions and values. When accompanied by appropriate introduction and critique, these exercises hold promise of achieving their training objectives.

"The Simulation of Cross-Cultural Communication," by Edward C. Stewart, paper for symposium of the German Development Institute, Berlin, Germany, March 1966; issued as Professional Paper 50-67, 26 pp., December 1967 (AREA II). AD-665 053

This paper describes the development of a cross-cultural simulation, the idea of the "contrast American", and the conceptualization of cultural differences in terms of dimensions. The theories behind these concepts are discussed in depth. Excerpts are given of recordings made of two simulation encounters between an American advisor and the contrast American. The intent of the work in simulation is to (a) increase the American's cultural self-understanding; (b) provide him with concepts that will aid him in the observation and classification of other cultures; and (c) present to him culture and cultural differences at an interpersonal, rather than an abstract, level.

"New Perspectives in Training and Assessment of Overseas Personnel," by Jack Danielian and Edward C. Stewart, paper for First Counterinsurgency Research and Development Symposium, Institute for Defense Analyses, Arlington, Va., June 1966; issued as Professional Paper 6-67, 14 pp., February 1967 (AREA II). AD-649 865

Lack of knowledge of what constitutes successful performance in paramilitary roles abroad is a major barrier to developing valid selection procedures or appropriate training techniques. One approach to the problem is to focus on and attempt to cultivate individual qualities of personnel as elicited in a live simulated advisory situation. Using trained foreign participants in prepared role-playing scripts, a simulated cross-cultural encounter was constructed which provided a realistic face-to-face encounter with a counterpart. In addition, the simulation permitted the conceptualization of a number of interrelated intervening criteria susceptible to measurement and useful to assessing the performance of the trainee. It is concluded that the specific discovery potential and heuristic value of the technique are distinct assets in this new area of research.

An Analysis of Human Relations Training and Its Implications for Overseas Performance, by Robert J. Foster and Jack Danielian, Technical Report 66-15, 40 pp., August 1966 (AREA I). AD-639 611

Evidence indicates that the nature of overseas work requires an increased emphasis on the people-related functions of job performance. The importance of these functions is further accentuated by the contrast between American and non-American values, assumptions, and perceptions, upon which effective communications and interpersonal behavior depend. Existing knowledge and experience in human relations training is reviewed in order to determine its relevance to preparing personnel for the cross-cultural aspects of overseas assignments. The training techniques of training groups (T-groups), role-playing, and case study are examined. Each is treated with respect to (a) a general description, (b) evidence as to its effectiveness, (c) its applications in area training, and (d) possible modifications for its use in training people for overseas work.

AREA (Cont.)

"An Approach to Cultural Self-Awareness," by Edward C. Stewart and John B. Pryle, paper for American Psychological Association convention, New York, September 1966; issued as Professional Paper 14-66, 11 pp., December 1966. AD-646 980

An approach for training Americans to work overseas is outlined. It is very important that the American understand himself as well as the people in another culture since communication between them invokes the personal and cultural predispositions of both. Various concepts for constructing a schemata of American culture with which trainees could identify as individuals are discussed. Role-playing exercises may be used to simulate cross-cultural communication between Americans and the idealized type of Contrast American.

"The Simulation of Cultural Differences," by Edward C. Stewart, *Journal of Communication*, vol. XVI, no. 4, December 1966; issued as Professional Paper 19-67, 16 pp., April 1967 (AREA II). AD-652 084

This paper describes aspects of work in area studies—the development of simulation, the concept of the "contrast American," and the conceptualization of culture and cultural differences in terms of dimensions. The intent of the work is three-fold: (a) to increase the American's understanding of himself as a cultural being; (b) to provide him with concepts facilitating observations and classifications of any other culture to which he may go; and (c) to present to him culture and cultural differences at the interpersonal level rather than at an exotic or abstract level. These techniques have been tested in cross-cultural training and in the training for cross-cultural interaction.

"The Need for Innovative Approaches for Training in Cross-Cultural Interaction," by Arthur J. Hoehn, paper for American Psychological Association convention, Washington, September 1967; revised version under the title, *The Need for Innovative Approaches for Training in Inter-Cultural Interaction*, issued as Professional Paper 9-68, 10 pp., March 1968. AD-667 821

There is growing acceptance of the view that personnel being assigned overseas require some special preparation for the inter-cultural aspects of such assignments. At present such training generally takes the form of short pre-departure orientation programs designed to provide a fund of relevant information. This paper points to the limitations of such an approach, suggests some of the alternative objectives of inter-cultural training, describes some current efforts toward new techniques, and points to the need for empirical assessment of the training value of the new approaches and techniques.

Some Resources for Area Training, by Robert J. Foster and David T. O'Nan, Technical Report 67-11, 119 pp., September 1967 (AREA I). AD-660 057 ED-016 939

This report lists resources that may be useful to individuals responsible for area training programs, especially if the trainees are being sent to developing nations. Part I gives descriptions, source data, and evaluative information about films likely to be of more than average value in area training. It also contains items concerned with technical assistance, development, social change, and cross-cultural communication. Part II lists some novels that capture the attitudes, feelings and aspirations of other cultures. The first two parts are classified primarily by cultural-geographic areas and by country. Part III is an annotated list of readings which describe and analyze American values in ways that may enable the reader to become more sensitive to the values and assumptions which determine his behavior. Part IV describes several organizations and publications other than novels or movies which provide information about sources of area training materials.

AREA (Cont.)

"Live Simulation of Affect-Laden Cultural Cognitions," by Jack Danielian, *Journal of Conflict Resolution*, vol. 11, no. 3, September 1967; issued as Professional Paper 47-67, 15 pp., November 1967 (AREA II). AD-665 035

As part of a research study to develop new concepts and techniques for area training, the construction of cross-cultural simulation exercises was guided by a model using culturally derived values and assumptions as the significant variables. The model is cognitive-functional and the overall perspective sociopsychological. Excerpts from live simulated cross-cultural encounters involving Americans and "Contrast Americans" provide examples of how basic cultural assumptions and core values can be effectively contrasted under controlled conditions. Implications for training are discussed.

Simulating Intercultural Communication Through Role-Playing, by Edward C. Stewart, Jack Danielian, and Robert J. Foster, Technical Report 69-7, 62 pp., May 1969 (AREA II). AD-688 698 ED-041 226

This report describes the design and development of training to increase cultural awareness. Significant aspects of intercultural interaction were simulated in a series of role-playing exercises. Typical American values and assumptions were demonstrably elicited from a trainee as he interacted with a "foreign" auxiliary. The auxiliary was trained to reflect a mirror image of American values and assumptions judged important to overseas performance. These values and assumptions were derived from an analysis of American "middle-class" culture. Several paper-and-pencil tests were developed as interim estimates of training objectives. Preliminary data bearing on the efficacy of the technique are presented. Possible variations in training format are suggested and some conclusions drawn for use of the simulation exercises in conjunction with other approaches and techniques.

Dimensions of Training for Overseas Assignment, by Robert J. Foster, Technical Report 69-11, 28 pp., June 1969 (AREA IV).

This report presents a conceptual framework for looking at the problem of training personnel for overseas assignment. Characteristics of the overseas situation that are unique, prevalent, and likely to affect performance significantly are briefly described and classified. Two types of goals for training are formulated: Objectives in terms of kind of learning and objectives in terms of content. Within each a conceptual breakdown of types of objectives is presented as a general analytical framework for deriving goals for specific training programs. The report represents an interpretative summary of much of the research and writing on training for overseas but does not attempt to survey the literature.

Research By-Products resulting from this research effort are listed in Part III.

ARMORCOM—Division No. 2

Improvement of the Communications Proficiency of Armor Personnel
(Research for the Department of the Army)

Simplification of the Panel Layout on Standard Series Tank Radios, by Boyd L. Mathers, Special Report 9, July 1957 (ARMORCOM I). PB-132401 AD-139 056

The control panel of the standard series tank radio was modified in certain minor ways to evaluate the effect on operator performance. Armor trainees were trained and tested on sets with the eight most important controls coded in one of three ways: (a) painted a single distinctive color, (b) painted three different colors according to their function, or (c) numbered according to their order of use. Performance of these trainees was compared with that of control groups trained and tested on standard sets. Recommendation is made for coding the controls on tank radios.

Research By-Products resulting from this research effort are listed in Part III.

ARMORNITE--Division No. 2

Human Factors in Armor Operations Under Conditions of Limited Visibility¹ (Research for the Department of the Army)

"Test-Retest Reliability of an Experimental Model of a Vision Tester for Armed Forces Use," by Howard C. Olson, paper for 34th meeting of the Armed Forces-National Research Council, Vision Committee, April 1954.

* Two groups of enlisted men, totaling 178 subjects and comparable with respect to age and intelligence, were tested and retested for nine visual skills on two types of testers. In general, the Armed Forces Vision Tester measured the skills with more consistency than did the experimental instrument. The two testers were essentially the same in ease of administration and in amount of testing time required.

A Survey of Human Factors in Military Night Operations (With Special Application to Armor), by Donald A. Gordon, Special Report 11, 66 pp., November 1957. PB-132528 AD-149 357

Scientific and technical literature dealing with human factors in night military operations was reviewed, primarily for its applicability to problems of night Armor operations. Although the formulation of research problems in Armor night training is dependent upon the further stabilization of night operations doctrine, a number of studies are presently required, especially in (a) effectiveness of and countermeasures against various illuminants and (b) the development of proficiency measures for Armor units and personnel in performance of night operations.

Illumination and Terrain As Factors Affecting the Speed of Tank Travel, by C.J. Bailey and Howard C. Olson, Special Report 12, 40 pp., March 1958 (ARMORNITE I). AD-156 766

This study was conducted to obtain data on the travel time of tanks under various combinations of terrain and illumination conditions. Conditions included (a) five different kinds of terrain, (b) four different levels of natural illumination, and (c) five different kinds of artificial illumination. Two hundred tank commander-driver teams (drawn from six medium tank battalions at Fort Knox) drove M48 tanks over a test course; each team drove under only one level of natural illumination and one condition of artificial illumination. Tank speeds were most affected by terrain, followed by the position of the driver's hatch (open or closed), and the artificial illuminant employed; the effects of varying nighttime natural illumination were less marked.

Recognition of Vehicles by Observers Looking Into a Searchlight Beam, by Howard C. Olson, Albert E. Goss, and William D. Voiers, Technical Report 49, 43 pp., July 1958 (ARMORNITE II). PB-135955 AD-200 848

Information useful for night combat tactics was gathered on how soon average observers facing a searchlight recognized tank-size vehicles approaching from the light. Variables included observer distance and position, and vehicle path and type. Similar recognition data were collected under conditions of darkness. When vehicle path and observer were near beam center, recognition generally occurred about 250 yards sooner than it did when vehicle path was across the beam from the observer; under the latter condition recognition generally did not occur until the vehicle neared or entered the beam (or almost as long as in darkness). Recognition range was 75 yards greater for tank than for truck; a masking noise had little effect on recognition range.

Model Simulator Studies of the Visibility of Military Targets at Night, by Charles E. Hamilton, Subcontractor's report, 84 pp., August 1958 (Subcontractor: Engineering Research Institute, Vision Research Laboratories, University of Michigan) (ARMORNITE VI). AD-679 197

The report summarizes experimental studies using a scale model simulator to determine visibility distances of military targets under certain nighttime illumination conditions. The experiments concerned both detection and identification of targets, which were observed along ground paths under simulated natural and artificial nighttime illumination. The studies were intended to provide a basis for better understanding and specifying the stimulus factors that influence target visibility under such conditions. Photometric data were used to relate the simulator conditions to actual field conditions.

¹ A star at the beginning of the abstract indicates that the item is one of the ARMORNITE papers or presentations included in *Collected Papers Prepared Under Work Unit ARMORNITE: Human Factors in Armor Operations Under Conditions of Limited Visibility*. Professional Paper 12-68, May 1968.

ARMORNITE (Cont.)

The Effectiveness of 90mm Tank Gun Fire Against the 18-Inch Searchlight, Technical Report 56, by Alfred J. Kraemer, June 1959 (ARMORNITE III). AD-309 249

To estimate probable effectiveness of fire from main guns of enemy tanks against 18-inch tank-mounted searchlights used to illuminate targets at night, experienced gunners fired at the mirrored image of a searchlight using main guns of M48 tanks. Ranges were 800 and 1500 yd. and firing positions were in beam center and 10° off beam center. First- and cumulative-round hit probabilities were derived from dispersion data collected by using large target panels and color-coded rounds of ammunition. Time needed for tanks to obtain a hit after light was turned on, and sensing capabilities for in-beam and out-of-beam firing positions were determined.

"Victory Before Dawn," by Marvin Parrott, *Armor*, vol. LXVIII, no. 4, July-August 1959.

The Effects of Practice on the Performance of Basic Armor Skills at Night, by Robert A. DeBurger, Research Memorandum, 43 pp., January 1961 (ARMORNITE VIII). AD-477 648

Performance in ten basic armor skills was studied under reduced visibility. Illumination ranged from full red lighting to complete darkness inside the turret, and from high to very low natural light outside. Some skills acquired in daytime training transferred readily to nighttime, but others would require additional training. The implication is that a training program with a certain proportion of night training may overtrain in some skills and undertrain in others.

"Localization of Peripheral Light Flashes," by Alfred J. Kraemer, David L. Easley, and Meredith J. Hall, paper for Midwestern Psychological Association meeting, Chicago, May 1961 (ARMORNITE XI).

*The purpose was to determine what kind of constant errors occur when observers are required to localize flashes in a nearly empty visual field. Stimulus positions varying in both the radial and eccentric dimensions were used; observers localized the flashes by pinpointing their positions. In two groups of 12 enlisted men there was a large constant error toward the center of the field. This error increased as a linear function of the distance of the flash location from the center.

Absolute Identification of Munsell Hues Under Red Illumination, by Kliem R. Miller, Research Memorandum, 10 pp., July 1961 (ARMORNITE IX). AD-632 690

Nine surface colors which are identifiable on an absolute basis in daylight were viewed under red light. Observers received practice in identifying them by number. Three different neutral gray masks were used to preclude identification on the basis of contrast. It was found that no more than four of these surface colors could be used together for coding under red light when absolute identification is required. Three groupings of four colors each can be used.

An Evaluation of Flash Localization Performance With the Fire Control System of the M48 Tank, by Alfred J. Kraemer, Technical Report 78, 30 pp., June 1962 (ARMORNITE X). AD-277 388

The object of this study was to evaluate the nighttime performance of tank gunners in localizing gun flashes with the fire control system of the M48 tank. Two night-simulated tests were conducted with 11 experienced and 20 inexperienced gunners, with these results: (a) In localizing 40 flash positions in a simulated periscope field of view, accuracy was fair within the reticle area but dropped off sharply outside it; (b) in laying the main tank gun against those flashes, accuracy was very poor. Error both in flash localization and in moving the gun controls contributed substantially to gun-laying error. It is concluded that the reticle of the M20 series periscopes (and presumably other periscopes and telescopes in which the reticle design covers only a small part of the field of view) is inadequate for localizing enemy gun flashes at night, and that the fire control system of the M48 series tank is inadequate for rapid laying of the main gun against nighttime targets that can be localized only by gun flashes.

Flash Localization and Reticle Design, by Alfred J. Kraemer, David L. Easley, and Meredith J. Hall, Research Memorandum, 13 pp., October 1962; presented under the title, "Gun Flash Localization as a Function of Reticle Design," at American Psychological Association convention, New York, September 1961 (ARMORNITE XI). AD-287 639

The purpose of this study was to determine the accuracy with which simulated gun flashes could be localized in the field of view of a tank periscope with the aid of four different grid-type reticles. Each of four groups of enlisted men localized 48 single flashes using one of the four reticles. For three of the reticles data were also obtained from three groups of officers.

ARMORNITE (Cont.)

Localizations were made by reading the azimuth and elevation of the perceived flash positions. No differences of consequence in performance were obtained between groups using different reticles. Enlisted men performed best with Reticle 4. Officers were found to localize more accurately than enlisted men, and it was suggested that the difference might be attributed to motivational factors.

The Effects of Two Types of Coordinate Systems on Localization of Peripheral Light Flashes, by Alfred J. Kraemer and David L. Easley, Research Memorandum, 15 pp., April 1963; paper for American Psychological Association convention, New York, September 1961 (ARMORNITE XI). AD-404 478

Ten groups of subjects localized single flashes, viewing monocularly, and responding with a projection pointer. Flash sources were located within a 64-degree circular field in a blacked-out room. One group saw only a fixation point. For another group only a cross was projected. Four groups were shown Cartesian coordinates, and four groups were shown polar coordinates. The density of the coordinate lines for the respective groups was increased by successive rectangular or polar bisection of the coordinate units, beginning with the cross. There were no appreciable differences in localization error between the groups which used one type of coordinate system and those which used the other. Introduction of the coordinate cross, and the bisection of the cross, led to successively smaller errors in localization, but further increases in line density did not. All groups made constant errors of localizing flashes closer to the visual axis than they actually were.

"The Effect of Flash Duration on the Localization of Peripheral Light Flashes," by David L. Easley and Myles A. Jackson, paper for Southeastern Psychological Association meeting, Miami Beach, Fla., April 1963.

*Four Groups of 12 subjects each were used in localizing two dimensions of a brief stimulus in a large visual field. Each subject localized 48 single flashes under four conditions of flash duration. Although overall localization accuracy improved with increasing flash duration, this effect did not hold for all radial and eccentric positions.

Operator Proficiency in Interpreting Ground Surveillance Radar Signals (AN/TPS-33), by Alfred J. Kraemer, David L. Easley, Arthur L. Miller, and Paul H. Stevenson, Technical Report 90, June 1964 (For Official Use Only) (ARMORNITE XIII). AD-442 607

To measure operator proficiency in identifying audio signals from the AN/TPS-33 ground surveillance radar, a test of 120 tape-recorded signals generated by representative military targets was administered to 43 trained operators. It was found that they could discriminate between personnel and vehicle targets. An experiment was run to determine whether operators can be trained to identify vehicles on the basis of signal characteristics unique to each vehicle type. After two days' training, 10 naive officer subjects learned to discriminate reliably between tracked and wheeled vehicles, although there were marked differences in operator aptitude. (U)

The Effects of Observer Location and Viewing Method on Target Detection With the 18-Inch Tank-Mounted Searchlight, by Nicholas B. Louis, Technical Report 91, 43 pp., June 1964 (ARMORNITE V). AD-445 050

An experiment was designed to determine the effects on target detection of observer location and method of viewing in relation to several types of targets at selected distances. Data were collected from 336 observers stationed at the searchlight source and at various distances up to 160 yards from the light, along a line at approximately a right angle to the axis of the beam. Using the tank range finder, periscope, binoculars, or unaided vision, observers tried to detect and identify a jeep, tank, and APC at each of four distances. Observers farther away from the light source detected and identified more targets than observers close to the searchlight. Binoculars and, for the first 30 seconds, unaided vision were more effective than the range finder or periscope in detecting and identifying targets.

ARMORNITE (Cont.)

An Evaluation of a New Reticle Design System for Gunlaying Against Flashes, by David L. Easley, Research Memorandum, 22 pp., November 1964 (Technical Advisory Service); portions of this material were presented at the American Psychological Association convention, Philadelphia, September 1963 (ARMORNITE X). AD-455 070

The purpose of the research was to determine the effectiveness of utilizing a grid-type reticle, graduated in turns of the azimuth and elevation controls of the M60 tank, for gunlaying against enemy gun fire at night. Using the experimental reticle in a simulated firing situation, six experienced and seven inexperienced gunners localized and laid an M60 tank gun on each of 40 flashes. Though no group differences were significant, these two groups of gunners performed somewhat more accurately, but laid less quickly on the average, than a third group, which used the standard reticle. In the simulated situation, performance was better than it was in a field study. Factors which may have operated in the field study to degrade performance are discussed.

Collected Papers Prepared Under Work Unit ARMORNITE: Human Factors in Armor Operations Under Conditions of Limited Visibility, Professional Paper 12-68, 33 pp., May 1968.

(ARMORNITE items included in the Professional Paper are indicated with a star at the beginning of the abstract.)

Results of studies to identify and solve auditory and visual training problems peculiar to Armor operations of the Army, under conditions of limited visibility, are discussed in this publication. The research reported includes a study of constant errors that occur when observers localized peripheral light flashes; an experiment on the effects of increasing flash duration on localization accuracy of peripheral light flashes; and a test of the reliability of an experimental vision tester for armed forces use.

Research By-Products resulting from this research effort are listed in Part III.

ARSUR—Division No. 2

**A Survey of Training Problems in Armor
(Research for the Department of the Army)**

Technical Supplement to the Report on a Survey of Armor Training Problems, by Howard C. Olson, Boyd L. Mathers, Norman Willard, Jr., and Norman E. Willmorth, Staff Memorandum, April 1955. AD-480 320

To help determine subject matter priorities in Armor training, experienced Armor personnel and students were asked to rank subject areas in their order of importance and in the order that proficiency is achieved. While officers and enlisted men differed consistently in their rankings of importance, both groups agreed that fire control equipment was most in need of greater training emphasis or more training time, and that dismounted drill, ceremonies, inspections, and command conferences need less training time than they currently received.

A Survey of Training Problems in Armor, by Edward J. Green, Boyd L. Mathers, Howard C. Olson, Norman Willard, Jr., and Norman E. Willmorth, interim report, June 1956. AD-480 319

Qualified Armor personnel (officers, training personnel, students, and trainees) indicated in interviews and questionnaires that the problem areas in Armor training were communications, driving and maintenance, gunnery, tactics, and administrative planning. The wide range of problems cited suggested that new training methods are needed in each problem area, with the emphasis in instruction changed in some areas from one subject to another.

AUTOSPAN—Division No. 7 (Social Science)

**Development of a Generalized Method for Preparing Self-Instructional Foreign Language Courses
(Research for the Department of the Army)**

"Providing Communication Experiences in Programmed Foreign Language Instruction," by George H. Brown, paper for Defense Language Institute Language Conference, Carlisle Barracks, Penn., October 1968; based on paper for American Psychological Association convention, San Francisco, September 1968; issued as Professional Paper 35-68, 8 pp., November 1968. AD-675 916

This paper describes two techniques in programmed instruction designed to offer a student genuine communication experiences in a foreign language. In "simulated tutoring," a recording is made of only the tutor's voice while he tutors a live subject in the correct pronunciation of a short dialogue. Students subsequently responding to the pre-recorded utterances experience the illusion that a live teacher is tutoring them. In "simulated conversation," the student is given information relevant to a communication situation (e.g., making a purchase) which is then simulated for him on tape in the foreign language. On the tape he is confronted with a relatively unpredictable set of questions and comments, to which he must generate appropriate responses.

Development and Evaluation of a Self-Instructional Spanish Course, by George H. Brown, Richard Beym, Thelma R. Smackey, and Angelo A. Cozzetto, Technical Report 70-14, 78 pp., September 1970 (AUTOSPAN II). AD-714 289 ED-044 996

This report describes the development and evaluation of a self-instructional Spanish course that was designed to produce an elementary communication skill, sufficient to enable a visitor in a Spanish-speaking country to cope with routine situations he is likely to encounter. The course consists of 106 lessons (text and tapes). The tapes are playable on any conventional tape device. The course involves what are believed to be the best features from the fields of modern classroom teaching, tutorial instruction, and programmed instruction. A group of nine military personnel with no prior Spanish training completed the course in an average of 73.7 hours. Average scores on the three parts of the final examination were 73%, 85%, and 78%. Results were interpreted as establishing the feasibility of building self-instructional foreign language courses which teach a useful, although elementary, communication skill.

AVTRAIN—Division No. 6 (Aviation)

**A Study of U.S. Coast Guard Aviator Training and Training Device Requirements
(Research for the U.S. Coast Guard)**

A Study of U.S. Coast Guard Aviator Training Requirements, by Eugene R. Hall, Paul W. Caro, Jr., and Oran B. Jolley, HUMRRO Division No. 6 (Aviation) and Commander Gilbert E. Brown, Jr., United States Coast Guard, Technical Report 69-102, 89 pp., December 1969. AD-707 677

This report is concerned with relevant training methods for Coast Guard aviation. To meet this objective, a comprehensive study of aviator requirements during search and rescue missions was chosen for analysis in each of the four aircraft used by the Coast Guard. Interview data were used as the basis for a description of aviator performance and for a tabular listing of specific tasks involved. The report shows desirable functional characteristics for synthetic devices and provides a basis for subsequent development of specific operationally oriented training programs.

AVTRAIN (Cont.)

Design and Procurement Bases for Coast Guard Aircraft Simulators, by Paul W. Caro and Eugene R. Hall, HUMRRO Division No. 6 (Aviation) and Commander Gilbert E. Brown, Jr., United States Coast Guard, Technical Report 69-103, 56 pp., December 1969. AD-708 209

In this exploratory study of the potential role of flight training devices in Coast Guard aviation training programs, the characteristics of the required synthetic training equipment, and development of plans for its funding and procurement are discussed. The magnitude of the synthetic flight training requirement and the cost-effectiveness benefits to be realized from use of such equipment are also examined. It is concluded that substantial training cost savings can be realized as a consequence of Variable Cockpit Training System (VCTS) utilization.

"Systems Engineering of Coast Guard Aviation Training," by Eugene R. Hall and Paul W. Caro, paper for Psychology in the Air Force symposium, U.S. Air Force Academy, Colorado Springs, Colo., April 1971.

This paper describes a total-program application of the systems-engineering concept, including: (a) the techniques used to develop job-relevant terminal behavioral objectives (the Coast Guard search and rescue flight mission provides the operational context); (b) the assignment of objectives to academic, synthetic, and flight training; (c) the integration of these components into a systems-engineered training program; (d) the development of relatively objective proficiency assessment techniques; (e) the development of a flying training quality control system for maintaining and enhancing instructional efficiency and for management of the training system.

BASICTRAIN--Division No. 4¹

**Improved Training Procedures for Basic Combat Training (ATP 21-114)
(Research for the Department of the Army)**

§ *Some Problems of Basic Training Effectiveness*, by Richard Snyder, interim report, September 1954 (BASICTRAIN I). AD-479 107

This report presents questionnaire data from 272 trainees representing five first-cycle training companies. Major findings of the survey, which are considered within the context of the new soldier's first Army training, indicated that the soldiers felt there was (a) lack of sleep and of time for their personal affairs, (b) poor coordination resulting in wasted time, (c) harsh treatment and harassment, (d) ineffective leadership, and (e) lack of communication between trainees and cadre. The findings were interpreted as indicating organizational rather than individual problems.

§ *Achievement in Basic Training*, by George D. Greer and Benjamin W. White, Staff Memorandum, July 1955 (BASICTRAIN I). AD-479 069

This report describes what was learned in eight weeks of basic combat training by a sample of Sixth Infantry Division trainees. Performance and written test results are reported and levels of knowledge at the outset of basic training are compared with those attained by the end of eight weeks. There was a gain of training in a Military Information Test (included in the report) consisting of 147 multiple-choice items. In-the-field performance test results indicate that some skills are learned by the vast majority of trainees during the course, while others are learned by only a small minority of men. Suggestions regarding the use of this information in the planning and revising of the curriculum are made.

§ *Basic Military Information and Combat Effectiveness*, by George D. Greer, Jr., and Martha Myers, Staff Memorandum, July 1955 (BASICTRAIN I). AD-478 558

Over 300 combat infantrymen in Korea, identified as fighters or non-fighters, were given a 300-item written Military Information Test covering combat-relevant information taught in Basic Combat and Advanced Individual Training. Sixty-four fighter/non-fighter pairs were matched on Aptitude Area I scores. Fighters were superior to non-fighters on the total test and on the operation, maintenance, and mechanics of weapons; preparation for and behavior during defense; and behavior during imminent or actual contact with the enemy. On more than 15% of the items, neither group possessed accurate relevant information. For the combined group, the highest level of information was in tactics; next highest, weapons; lowest, general subjects.

§ *Basic Infantry Skills Performance Test, ATP 21-114*, by George D. Greer, Jr., Finis W. Wilson, and Morton G. Wolpert, Staff Memorandum, March 1956. AD-479 070

This research by-product is a performance achievement test of military skills and knowledge used as a criterion measure in a broad survey of Basic Training. For a detailed presentation of the total test station and item scores, and the test's reliability, refer to *Achievement in Basic Training*, Staff Memorandum by George Greer and Benjamin White, July 1955.

§ "An Analysis of Certain Determinants, Characteristics, and Covariates of Basic Trainee Leadership Sociometric Data," by Darwin Palmer and George D. Greer, Jr., paper for Western Psychological Association meeting, 1956.

This study was an attempt to determine the correlates of peer evaluations of existing and potential trainee squad leaders in the Army. Between 200 and 250 men in each of 40 Basic Training companies were given batteries of tests at several points during training. It was found that trainee evaluation of their fellows was reliable; between the fourth and eighth week of Basic Training the average correlation for positive votes was .85, and for negative votes, .77. There were significant and consistent relationships of background and descriptive variables. It appeared that a sociometric test might be useful as a criterion in developing other squad leader selection instruments.

¹ This Work Unit was initiated at Division No. 3. The symbol § indicated an item prepared at Division No. 3.

BASICTRAIN (Cont.)

§ "Predictors, Descriptions and Correlates of Basic Training Delinquents," by George D. Greer, Jr., paper for Western Psychological Association meeting, Spring 1956.

This study deals with the personal, as distinguished from situational, variables related to delinquent behavior during the eight weeks of Basic Training. Over a six-month period nearly 10,000 trainees were categorized into four groups: three delinquent and one "normal." Members of all three delinquent groups had a history of lower socioeconomic associations, more civilian arrests, less formal education, and a greater frequency of "hooky playing" and running away from home as children. On the Army Aptitude Area I score, the mean score of the normal group was 108 and the average scores of the three delinquent groups were 101, 97, and 89. The findings of this study closely paralleled results of research on juvenile delinquents.

§ "Evaluation of Four and Eight Weeks Basic Training for Men of Various Intelligence Levels," by Victor B. Cline, Alan Beals, and Dennis Seidman, paper for American Psychological Association convention, Chicago, September 1956 (BASICTRAIN II).

Army inductees who received the usual eight weeks basic training course were compared with other trainees who received a condensed four weeks training cycle. On tests of a paper-pencil type, four-week trainees and eight-week trainees performed equally well. When tests involving performance-type activities such as assembling weapons and operating communications equipment were compared, high intelligence soldiers learned as much in four weeks as in eight but middle and low intelligence men did profit by the additional training. Soldiers of high intelligence learned just as much when trained alongside men of middle and low intelligence as when trained in special companies by themselves.

§ *Evaluation of Four-Week and Eight-Week Basic Training for Men of Various Intelligence Levels*, by Victor B. Cline, Alan Beals, and Dennis Seidman, Technical Report 32, November 1956 (BASICTRAIN II). PB-124722 AD-114 111

This study was designed (a) to determine the effects on trainee performance of substitution of an accelerated four-week for the conventional eight-week basic training program, and (b) to examine the possibilities for more efficient utilization of high-aptitude personnel. Results indicated that, with regard to military information, all aptitude levels learned as much in the four-week course as in the standard eight-week course. On performance-type tests, middle- and low-aptitude men benefited from the full eight weeks' training. With respect to rifle marksmanship and physical fitness, the full eight weeks' training yielded better results at all intelligence levels. The high-aptitude personnel in the four-week training program acquired as much military information, and did as well on performance tests, as high-aptitude personnel in the eight-week course, and were superior to the normal-input eight-week trainees.

§ *Basic Training Effectiveness: A Discussion of Instruction Centralization, The Training Curriculum and Achievement Evaluation*, by George D. Greer, Jr., Staff Memorandum, June 1957 (BASICTRAIN I). AD-482 180

This paper is a discussion of three factors important to Basic Training in the Army: the organizational structure within which the training occurs, the curriculum, and the evaluation procedures necessary for affording indication of training effectiveness. The discussion is based on personal observations and on a survey in which 10,000 trainees, 40 officers, and 200 NCO cadre from 40 training companies were tested at three periods in a Basic Training cycle.

Content Outline and Reference Data, ATP 21-114 (14 November 1958), Research Memorandum, August 1959. AD-482 181

The Development of a List of Minimal Training Goals for Basic Combat Training, by Albert Elkin, Technical Report 67, December 1960 (BASICTRAIN I). PB-153865 AD-248 634

The Basic Combat Training Program (ATP 21-114, Nov 58) was analyzed in relation to each of 17 supporting Army Subject Schedules. Discrepancies between the ATP and referenced subject schedules were noted and revisions suggested. On the basis of this analysis, a list of minimum training goals was devised for each subject presented in the report. These suggested training goals cover the minimum knowledge and skills needed by the individual basic combat trainee.

BASICTRAIN (Cont.)

Effects of Training Response Mode, Test Form, and Measure on Acquisition of Semi-Ordered Factual Materials, by Joseph F. Follettie, Research Memorandum, April 1961 (BASICTRAIN II). AD-632 189

This report presents findings from the assessment of various programmed materials that suggest no difference between live and taped lecture, a significant advantage of read material over heard material, a significant advantage of self-paced reading over class-paced reading, and a significant advantage of the plain book format over the scrambled book format. Results also suggest that recognition form tests based on neo-rote contents might be used in lieu of recall form tests in that there is a generally stable relationship between the two test forms.

Programmed Instruction: A Plan of Research, by Thomas J. McCrystal, Research Memorandum, May 1961 (BASICTRAIN II). AD-632 568

Research By-Products resulting from this research effort are listed in Part III.

CAMBCOM—Division No. 4

Knowledges, Skills, and Thought Processes of the Battalion Commander and Primary Staff (Research for the Department of the Army)

"Work Unit CAMBCOM—Knowledges, Skills, and Thought Processes of the Battalion Commander and Primary Staff," by Theodore E. Powers, briefing to U.S. Continental Army Command, Fort Monroe, Va., October 1968; included in *Use of Job and Task Analysis in Training*, Professional Paper 1-69, 42 pp., January 1969. AD-688 810

Knowledge and Skills Inventory, Combat Arms Maneuver Battalion.

A tentative task inventory for each of the principal staff officers of the six types of maneuver battalion was developed and commented on by the U.S. Army Infantry School, revised, then submitted to selected maneuver battalion staffs for comments by job incumbents. Based on this survey, a final inventory was developed and submitted to the staffs of more than 80% of all maneuver battalions. Results of this survey are reported in these Research By-Products.

The Adjutant S-1, Research By-Product, 1970.

The Intelligence Officer S-2, Research By-Product, 1970.

The Operations/Training Officer S-3, Research By-Product, 1970.

The Logistics Officer S-4, Research By-Product, 1970.

CAREER—Division No. 3

The Army as a Career for Existing and Potential Qualified Personnel¹ (Research for the Department of the Army)

"A Bibliography on Military Career Attractiveness," material developed in connection with briefing to Army Personnel and Training Research Advisory Committee, June 1958 (CAREER I).

*In most of the categories, reports are listed alphabetically by title under the military agency which produced them. The list includes items read or abstracted by the researchers and other relevant items listed in annotated bibliographies.

"Some Problems in the Retention of Army Enlisted Personnel," by Richard Snyder, paper for symposium at American Psychological Association convention, Washington, D.C., September 1958 (CAREER I).

*This paper deals with the recruitment and retention aspects of military manpower problems, especially those concerning retention of personnel having technical skills and leadership potential. Research on possible techniques to be used in the differential training of volunteers and drafted soldiers is discussed.

¹A star at the beginning of the abstract indicates that the item is one of the CAREER papers or presentations included in *Collected Papers Prepared Under Work Unit CAREER: The Army as a Career for Existing and Potential Qualified Personnel*, Professional Paper 11-69, April 1969.

CAREER (Cont.)

"The Effect of Avoidance of Conflict on Decisions About Continuing in an Activity," by Judson Mills and Richard Snyder, paper for Western Psychological Association meeting, Spring 1959 (CAREER III).

*On the basic assumption that persons faced with a difficult important decision will tend to avoid positive action, 80 Army recruits were studied to determine the frequency with which they might make a request either to change or continue an assigned activity. The results supported the prediction that persons in conflict about changing from one activity to another will change less frequently when they must make a request to change, than when they must make a request to continue.

"Effects of Uncertainty About Original Enlistment on Reported Change in Opinion Toward the Army," by Richard Snyder and Harry A. Burdick, paper for American Psychological Association convention, New York City, 1961.

*From dissonance theory it was predicted that recruit opinions about the Army will tend to become more favorable following initial exposure to service as a function of the uncertainty about the original enlistment decision, and the importance of the decision. Subjects were 635 volunteer recruits. Uncertainty was inferred from responses to the question: "Would you have enlisted in the Army if there had been no draft?" Importance was inferred from expressed career interest. Results confirmed both predictions. The curvilinear relationship between reported opinion change and responses from which uncertainty was inferred is difficult to interpret plausibly by alternative theories.

Avoidance of Commitment and Need for Closure as Determinants of Behavior in Decision Situations, by Richard Snyder and Judson Mills, Research Report 12, June 1963 (CAREER III). AD-478 519

Investigation was made of behavior in decision situations involving choice among mutually exclusive alternatives, in which action did not necessarily have to be taken. Three hypotheses were tested which concerned the influence of certain variables upon the tendency to avoid commitment to a specific course of action. Choices were recorded by subjects in a four-part questionnaire. Results were analyzed in terms of several variables and their experimental manipulations. It was concluded that a subject, in a situation in which he does not need to take action in order to know the outcome, will not be likely to express his real preference unless that preference is strong.

Collected Papers Prepared Under Work Unit CAREER: The Army as a Career for Existing and Potential Qualified Personnel, Professional Paper 11-69, 26 pp., April 1969. AD-688 814

(CAREER items included in this Professional Paper are indicated with a star at the beginning of the abstract.)

Research in the area of developing specific measures for increasing the attractiveness of Army careers and for improving the retention of high caliber personnel, with particular emphasis on careers in the combat and "hard" skills, is reported in this series of papers. The collection includes a bibliography on military career attractiveness as an appendix item.

CENTER—Division No. 3

**Improvement of Effectiveness of Basic Combat Training Graduates
(Research for the Department of the Army)**

A Study of Category IV Personnel in Basic Training, by S. James Goffard, Morris Showel, and Hilton M. Bialek, Technical Report 66-2, 36 pp., April 1966. AD-481 737

Samples of men in Mental Category IV and men in categories of higher mental ability (I, II, III), who were matched according to their Army component, were selected from companies in Basic Combat Training (BCT). Information about their backgrounds, aspirations, attitudes, aptitudes, and performances during and at the end of BCT was gathered from individual interviews, ratings, and Army records. The differences between the men in Category IV and those in Categories I, II, and III on most of these measures were small but statistically stable. The socioeconomic backgrounds of Category IV personnel tended to be poorer, and their performances in BCT were only slightly less adequate, and their attitudes toward military service were more favorable. Overlapping between the two groups was very extensive on almost every measure and on MOS assignment.

The Corrective Action Questionnaire: Development and Administration to Officers and NCOs, by Morris Showel, Technical Report 66-5, 41 pp., May 1966. AD-637 789

This study was undertaken to develop a research instrument that would assess the degree of severity with which NCOs and company grade officers react to various types of situations in which trainees fail to perform properly. A preliminary version of a Corrective Action Questionnaire was developed, and it was administered to 131 subjects in order to develop information to revise the research instrument. Results of the trial administration suggested that: (a) more severe corrective action would be taken by older cadre who had spent more time in the Army, served longer in a training company, and had not attended college; (b) officers consistently proposed less severe corrective action than NCOs; (c) First Sergeants and those NCOs rated by their superiors as above average tended to be more severe than those NCOs rated as below average; and (d) officers and NCOs showed a high degree of agreement as to the relative seriousness of trainee performance failures. The Corrective Action Questionnaire as revised, may be expected to be an effective research instrument.

Preliminary Study of Motivation and Incentives in Basic Combat Training, by Hilton Bialek and Michael McNeil, Technical Report 68-6, 12 pp., May 1968. AD-670 744

In an effort to get a useful measure of subjective reward values for Basic Combat Training personnel, 43 possible incentives were rated by two groups of trainees on a 7-point scale, from most attractive to least attractive. Nineteen incentives were identified as being reliable and of low variability. Of these, the 10 most attractive incentives were categorized into one of three classes: Recognition (Peer and/or Social), Material Reward, or Autonomy (Freedom). It was concluded that the 10 specific incentives identified and the categories of Recognition and Autonomy might be controlled and varied to measure the effectiveness of variations in BCT.

CHATTER—Psychological Warfare Division
Factors Contributing to the Gaining of Attention, Understanding, and Credibility in
Communications
(Research for the Department of the Army)

Factors Affecting Credibility in Psychological Warfare Communications, by Earl R. Carlson and Herbert I. Abelson. Special Report 5, July 1956. PB-132400 AD-122 564

This report summarizes a survey of the factors that contribute to achieving credibility for a propaganda message. It is designed specifically for Army psychological warfare personnel and is intended to serve as a "primer on credibility" for the basic indoctrination of (a) the students and faculty at the Psychological Warfare School, (b) officers assigned to the staff of the Chief of Psychological Warfare, and (c) personnel in operational psywar units. As a primer, it provides only a starting point for more specialized inquiry in the field of communications credibility.

CINCO—Division No. 1 (System Operations)
Procurement, Classification, and Training Problems at the Army Intelligence School
(Research for the Department of the Army)

Procurement of Counter Intelligence Corps Trainees, by Roy J. Jones and Berton Winograd, Special Report 10, October 1957 (CINCO I). PB-134601 AD-145 273

This study investigated two problems of procurement of trainees for the Counter Intelligence Corps: the setting of quotas for the basic training centers and the feasibility of extending the enlistment program to three years. Quotas as presently based on estimates of future strength of the training centers were compared with quotas based on actual input and on the number of men eligible for CIC training; quota-setting procedure based on the number of eligible men at each training center would be somewhat more accurate than the other methods. The proportion of recommended eligibles who were willing to extend their enlistment to three years indicates that a three-year enlistment requirement could be instituted without reducing the current quality standards.

**CIVIC—Division No. 7 (Social Science)
Guidelines for Civic Action Advisors
(Research for the Department of the Army)**

Human Factors in Civic Action: A Selected Annotated Bibliography, by Robert J. Foster, with the technical assistance of J. Charnel Anderson, Robert D. Nye, and Sheldon Smith, Research Memorandum, 92 pp., June 1963. AD-412 657

This bibliography is designed to aid in educating and training United States personnel who will assist the military personnel of developing nations to play an active role in the socioeconomic advancement of their countries. It should also be of interest to personnel of agencies that are concerned with providing technical assistance to the developing nations. The chief goal of the compilation is to provide a selected list of items which a busy officer could reasonably expect to read in entirety within a few weeks before going overseas. Priority has been given to items that are nontechnical and thought-provoking, have relevance to most underdeveloped areas, are of article rather than book length, and emphasize the problems of working across cultural barriers. Basic divisions of the bibliography are—Philosophy of Civic Action and Foreign Aid, The Nature of Underdeveloped Countries, The Techniques of Planned Change, and Individual Effectiveness.

"The Process of Cross-Cultural Innovation," by Arthur H. Niehoff and J. Charnel Anderson, *International Development Review*, vol. VI, no. 2, June 1964; issued as Professional Paper 36-67, 18 pp., August 1967 (CIVIC II). AS-659 038

This paper explores cross-cultural innovation by analyzing data based on actual field studies. The primary criterion for case selection was that the characteristics of the innovator and the recipient groups be described. The country where the innovation was attempted is listed, along with the specific type of innovation proposed and specific description of the change effort. The cases are then evaluated in terms of success and failure, and the most important factors, positive or negative, influencing the outcome are analyzed. The emerging pattern of the total process is discussed.

"A Quantitative Approach to the Study of Directed Cross-Cultural Change," by Arthur H. Niehoff, *American Anthropological Association Newsletter*, vol. 5, no. 7, September 1964; issued as Professional Paper 40-68, 6 pp., December 1968 (CIVIC II). AD-682 347

A comparative method for analyzing efforts of induced change in cross-cultural situations is described. Case histories of efforts to introduce innovations to local communities of the developing nations were separated into "success" and "failure" groups. The behavioral components that influenced such outcomes were categorized according to whether they provided positive or negative influence. Two major influence types emerged: change agent techniques and recipient responses. By analyzing a sizable number of such case histories, quantified statements should be possible as to the most important influences.

A Selected Bibliography of Cross-Cultural Change Projects, by Arthur H. Niehoff and J. Charnel Anderson, Research Memorandum, 32 pp., October 1964 (CIVIC II). AD-608 740

This report is a bibliography of case histories each of which describes an effort by a change agent, or agents, to introduce a new idea or technique into a culture other than his own. In compiling this selection, the normal range of technical aid projects was included, such as community development, agricultural extension, education, public health, and so forth. The cases are grouped by country or political unit in alphabetical order. Each citation is followed by a statement of the goal of the innovator and, when available, the size and time period of the project.

CIVIC (Cont.)

"The Primary Variables in Directed Cross-Cultural Change," by Arthur H. Niehoff and J. Charnel Anderson, paper for American Anthropological Association meeting, Detroit, November 1964; issued as Professional Paper 36-68, 28 pp., November 1968 (CIVIC II). AD-679 917

From comparative analyses of 171 cases, the principal factors that acted as sanctions or barriers in the introduction of innovations were extracted. They divide themselves into three types of behavior: (a) the techniques, such as communication, demonstration, and flexibility, of the innovator; (b) the motivation—in the form of felt need, practical economic benefit, novelty—for acceptance or rejection by the recipients; and (c) the reaction, such as leadership, theological beliefs, and economic patterns, produced by the traditional cultural patterns.

"Peasant Fatalism and Socioeconomic Innovation," by Arthur Niehoff, paper for American Anthropological Association meeting, Denver, November 1965; revised version by Arthur H. Niehoff and J. Charnel Anderson in *Human Organization*, vol. 25, no. 4, Winter 1966; also issued as Professional Paper 33-67, 13 pp., June 1967 (CIVIC II). AD-637 001

An examination of the nature of negativism in developing countries resulted in isolation of three main types—supernatural, situational, and project negativism. Although all these forces are significant in sociotechnical change, they do not constitute a critical influence nearly as often as do other characteristics of traditional society such as leadership patterns, social structure, and economic patterns. They are still less significant in the total change process than communication techniques, type of participation obtained, or degree of utilization of traditional culture.

"Food Habits and the Introduction of New Foods," by Arthur H. Niehoff, paper for American Association for the Advancement of Science meeting, Washington, December 1966; published in *Journal of the Washington Academy of Sciences*, vol. 57, February 1967; also issued as Professional Paper 9-67, 10 pp., March 1967. AD-650 448

Normal resistances to new foods being introduced in local communities, based chiefly on traditional habits and beliefs, can be overcome by selecting proper innovations and using proper techniques. The innovation most likely to be successful is one that adapts to local habits and beliefs, is based on needs recognized by the local people, and provides a clearly perceived practical benefit to them. This means that a minimum understanding of the local culture is needed for new ideas to be successfully introduced. The primary requirements for introducing the idea are efficient communication channels for transferring the knowledge of it (most critical being the creation of feedback channels from the grass-roots level), and obtaining the sanction of local leaders.

"Intra-Group Communication and Induced Change," by Arthur H. Niehoff, paper for Society for Applied Anthropology meeting, Washington, May 1967; issued as Professional Paper 25-67, 10 pp., June 1967. AD-654 124

This paper discusses the major technique that influences the process of introducing socio-economic innovations in local communities of non-industrial countries: the establishment of effective communication. Positive gossip is shown to be an index of efficient information flow, and the author describes several case histories in which this is the most important factor in a project's success. Other innovation techniques used by change agents to bring about innovations in a local community, as noted in the case histories, include adaptation to local cultural patterns, utilization of local leadership, and utilization of positive motivation.

CIVIC (Cont.)

Promoting Civic Action in Less Developed Nations: A Conceptualization of the U.S. Military Mission Role, by Alfred J. Kraemer, Technical Report 68-10, 31 pp., July 1968 (CIVIC I). AD-673 672

In its efforts to promote innovations among the host-country military in the less developed nations, the U.S. military mission may not be able to function effectively in the role of expert advisor because the military system of the host country may lack many of the characteristics necessary for adopting innovations. Under such conditions it is more fruitful to think of the mission's role as helping develop the conditions under which the innovations will be adopted. This role is particularly appropriate for the mission's efforts to promote civic action (conceived as the development of people's capacities) in countries where the military's acceptance of civic action as one of their main functions constitutes a radical social innovation. Mission responsibilities in the performance of this role are outlined and some implications of the concepts proposed are offered.

Planned Change in Agrarian Countries, by Arthur H. Niehoff. Technical Report 69-21, 152 pp., December 1969 (CIVIC II). AD-701 167 ED-040 349

The report is concerned with guidelines for relevant development projects in agrarian countries. Case studies of past projects, which were used for analysis, show that factors of special importance to success in development projects are: cooperation of local leaders; degree and immediacy of practical benefits; innovator skill in communication processes; and participation of recipients in implementing the change, and in maintaining the innovations.

Research By-Products resulting from this research effort are listed in Part III.

CLASSIC—Division No. 1 (System Operations)¹

**A Program of Research on the Activities and Training of Guided Missiles Personnel
(Research for the Department of the Army)**

A Study of Human Factors in the Operation of the Nike Ajax System, Part I: Training Problems and Requirements. Part II: The "Shooting Team"—Recommended Operating Procedures, by Randall M. Hanes and Robert A. Goldbeck, Technical Report 51, November 1958 (For Official Use Only) (Subcontractor: American Institute for Research) (CLASSIC I). AD-207 097

As an initial step in standardizing training procedures and developing proficiency measures for guided missile personnel, a survey of training problems and an analysis of Nike-Ajax team procedures were undertaken. Data on school and on-site training were obtained from various Nike-Ajax installations and from the AAA & GM School. Operating procedures were analyzed through summarization and integration of the procedures which are followed by a number of Nike-Ajax batteries in the Pittsburgh, Chicago, and New York Areas. Training modifications are recommended, and a new set of standardized alert procedures was developed and is presented. (U)

A Study of Human Factors in the Operation of the Nike Ajax System, Part III: Technical Appendices, by Randall M. Hanes and Robert A. Goldbeck, Research Memorandum, November 1958 (For Official Use Only) (Subcontractor: American Institute for Research) (CLASSIC I) AD-482 186

Research By-Products resulting from this research effort are listed in Part III.

¹ This Work Unit terminated at Division No. 5.

COLDSPOT—Division No. 1 (System Operations)¹
Human Factors in Military Performance in Extreme Cold Weather
(Research for the Department of the Army)

A Survey of Human Factors in Military Performance in Extreme Cold Weather, by Norman F. Washburne, Research Memorandum, June 1960 (COLDSPOT I). AD-477 889

"Command Decision Making in the Far North," by Norman F. Washburne, paper for American Sociological Association meeting, September 1960 (COLDSPOT II).

Cold Weather Operational Training of Infantry Forces in the Strategic Army Corps, by Norman F. Washburne, Technical Report 86, February 1964 (For Official Use Only) (COLDSPOT II). AD-432 095

This research was undertaken to study the training problems of infantry forces in the Strategic Army Corps during cold-weather operations. A research team was attached to CONUS forces to observe troop performance during the training and maneuver phases of Exercise LITTLE BEAR in Alaska during the winter of 1960. The data indicated areas of training content needing greater emphasis, and included suggestions regarding the context in which certain portions of the training should be given. (U)

COMSERVE—Division No. 7 (Social Science)
Development of a Manual for Community Service Volunteers
(Research for the Department of the Army)

Handbook on Volunteers in Army Community Service, by Stanley Levin, Noel T. Parisien, and Daniel Thursz, 126 pp., October 1969. (Subcontractor: Center for the Study of Voluntarism, School of Social Work, University of Maryland). AD-701 463

This handbook offers comprehensive information on developing and administering a volunteer program for Army Community Service (ACS). The handbook stresses the encouragement of innovation, flexibility, and individual initiative both in personnel and programs. Since ACS Centers differ in many ways, the handbook discusses general guidelines and suggestions rather than detailed specifications in order that the information can be adapted and interpreted according to local circumstances. Among the topics covered are recruiting volunteers, interviewing, preparing job descriptions and facilities, supervision, and training design.

¹This Work Unit was initiated in the Executive Office. The symbol § indicates an item prepared at the Executive Office.

COMTAC—Division No. 4¹

**Tactual Communication as a Medium for Increasing Control in Small-Unit Operations
(Research for the Department of the Army)**

"Recognition Thresholds and Accuracy for Differing Body Regions as a Function of Electrode Number and Spacing," by R.L. Brown, R.A. Sperr, K. Schmitt, and A. Solomon, *Perceptual and Motor Skills*, vol. 23, no. 3, December 1966; issued as Professional Paper 3-67, 10 pp., January 1967 (COMTAC I). AD-649 318

Recognition thresholds and maximum accuracy levels were established on 12 subjects as a function of number of electrodes (2, 3, 4, and 5) and inter-electrode distance for various body regions (chest, abdomen, and back). There was little systematic difference among body regions with respect to the threshold and accuracy data; however, the number of electrodes proved to be significant. The abdomen appeared to be a slightly more favorable electrode site with a 5-electrode array.

"Stimulus Parameter Considerations and Individual Differences in Cutaneous Sensitivity to Electropulse Stimulation," by R.L. Brown, R.A. Sperr, K. Schmitt, and A. Solomon, *Perceptual and Motor Skills*, vol. 23, no. 3, December 1966; issued as Professional Paper 4-67, 10 pp., January 1967 (COMTAC I). AD-649 319

The two experiments described were concerned with defining the optimal parameter values for an electropulse stimulus and the extent of subject differences. In the first experiment, touch and pain threshold variations were established on 12 subjects as a function of pulse number (1, 4, 8) and pulse duration (0.5, 1.0 msec.). Significant support was obtained for use of a single pulse of 0.5-msec. duration. In the second experiment, touch and pain thresholds were obtained on 20 subjects coincident with body region and session variation. The abdomen and chest appear to be ideal electrode sites. Subject differences over time were discussed.

"Electropulse Responsivity to Changes in Skin Moisture," by R.L. Brown, R.A. Sperr, and A. Solomon, *Perceptual and Motor Skills*, vol. 24, no. 1, February 1967; issued as Professional Paper 16-67, 8 pp., April 1967 (COMTAC I). AD-651 053

Twelve subjects were exposed to electropulse stimulation under three moisture treatments: dry, water immersion, and a fluid approximation of sweat. Touch threshold data were obtained under these conditions during the first half of the experiment and electropulse recognition responses during the second half. A significant threshold rise occurred with increased amounts of moisture on the skin. Similarly, recognition accuracy decreased but remained with a 90 to 100% range. Human engineering implications pertinent to a tactual communication are discussed.

"A Differential Comparison of Two Types of Electropulse Alphabets Based on Locus of Stimulation," by R.L. Brown, D. Nibarger, G. Ollie, and A. Solomon, *Perceptual and Motor Skills*, vol. 24, no. 3, June 1967; issued as Professional Paper 32-67, 8 pp., June 1967 (COMTAC I). AD-655 746

Recognition accuracy was observed on 25 subjects with variation in the type placement (single- and multi-body regions) when varying numbers (1, 2, 3, 5, and 7) of electrode sites were pulsed simultaneously from among a 10-electrode array. Accuracy dropped drastically with increased number of sites pulsed and was most pronounced when the electrode array was restricted to a single region of the body. The accumulated data appear to cast serious doubt on the use of patterning of simultaneous electropulses as a fruitful approach to tactual communication. An alternative approach was proposed.

¹For earlier work in this area, see Exploratory Study 30.

COMTAC (Cont.)

A Content Analysis of Communications Within Army Small-Unit Patrolling Operations, by Ronald L. Brown, Technical Report 67-7, 45 pp., June 1967 (COMTAC I). AD-817 795

The study presents the results of a content analysis of communications within Army small-unit patrolling operations. Field observations and recordings were made of all communication acts which occurred during the course of seven Ranger patrols at both the jungle and mountain training sites. For each communication act the following details were recorded: (a) time of transmission, (b) content of message, (c) means of transmission, (d) designation of sender and receiver, and (e) nature of communication failures. This information provided: (a) a view of the informational flow within the organizational structure of a patrol, and (b) the basis for developing a set of brief codes suitable for use both with the proposed tactual communication system and existing signal techniques.

"Determinants of Tactual Perception of Finger-Drawn Symbols: Reappraisal," by Douglas S. Holmes, Jon E. Roedelstein, and Joseph A. Olmstead, *Perceptual and Motor Skills*, vol. 27, no. 2, October 1968; issued as Professional Paper 37-68, 16 pp., November 1968. AD-681 666

Previous researchers, notably Krech and Crutchfield (1958) and Natsoulas and Dubanoski (1964), have reported finding individual differences in perception of symbols drawn by finger on the skin. Natsoulas (1966, 1967), and Yonge (1965) have presented alternative formulations of the determinants of tactual perception of symbols. This paper contains an analysis of some of the conceptual and methodological issues involved and presents a third formulation. Failure to find individual differences with 46 subjects in the present study supports the conclusion that individual differences previously reported can be attributed to errors occurring under conditions of ambiguity.

Research By-Products resulting from this research effort are listed in Part III.

CONTACT—Division No. 7 (Social Science)¹

Development of Training Procedures for Faster Acquisition of Perishable Tactical Information From Non-English-Speaking Prisoners of War
(Research for the Department of the Army)

§ "A Feasibility Study of a Special, Machine-Taught Oral-Aural Russian Language Course," by E.H. Rocklyn and R.I. Moren, paper for American Psychological Association convention, September 1960 (CONTACT I).

Popularity of commercial, machine-taught, "do-it-yourself" foreign language courses is widespread. The effectiveness of such courses, especially in teaching speaking and understanding, is not usually evaluated. A special machine-taught course in speaking and understanding Russian was constructed to answer such questions as: Can basic skills in speaking and understanding foreign languages be programmed and machine-taught? Can students learn to pronounce Russian adequately without human (live) instruction or assistance? Can course material be programmed to produce and sustain student motivation? Administration and evaluation of this course supports the feasibility of machine-teaching foreign languages.

"A Limited Language for Obtaining Combat Information From POW's: A Pilot Study," by Richard I. Moren and Eugene H. Rocklyn, paper for American Psychological Association convention, September 1960 (CONTACT I).

In order for combat troops to obtain perishable tactical information from newly captured prisoners of war, knowledge of the enemy language is necessary. A limited language in 20 days. In a simulated POW situation they questioned Russian-speaking personnel and were able to obtain information which could have been of value in actual combat, thus demonstrating the feasibility of the model in the Slavic language family.

¹ This Work Unit was initiated at Division No. 1 (System Operations). The symbol § indicated an item prepared at Division No. 1.

CONTACT (Cont.)

"Problems in Programming an Intensive Oral-Aural Language Course," by Eugene H. Rocklyn, paper for First Conference of Language Programmers, University of Michigan, April 1961 (CONTACT I).

"An Approach to Automated Language Teaching," by Eugene H. Rocklyn, paper for District of Columbia Psychological Association meeting, [May 1961] (CONTACT I).

"Language Programing for the Foreign Student," by Eugene H. Rocklyn, paper for Speech Association of America convention, New York, December 1961; issued as Professional Paper 5-67, February 1967 (CONTACT I). AD-647 839 ED-022 401

The possibility of constructing a core language course that would be completely automated, or self-instructional, for the purpose of teaching foreign students to speak and understand English is discussed. In order to avoid superimposing English instruction upon the original educational goal of foreign students in the United States, a self-instructional English course built for the student's specific country might be given to him before he leaves for the United States, or soon after arrival if necessary. As an example of a self-instructional course, the author describes an automated course in the Russian language which was designed for a specialized military need. The problems faced in creating it, and their solutions are described. Course effectiveness, in terms of student ability to speak and understand the Russian material given, supports the feasibility of machine-teaching a limited language course.

Development and Evaluation of Training Methods for the Rapid Acquisition of Language Skills, by Eugene H. Rocklyn, Richard I. Moren, and Andre Zinovieff, Research Report 9, January 1962 (CONTACT I). AD-271 642

This research explored the feasibility of machine-teaching enough of a foreign language to combat soldiers to enable them to obtain tactical information from newly captured prisoners of war. The course material used in the pilot study (Russian) was limited to tactical subject matter, presented by means of dual-track tape recorders, and arranged to build and sustain motivation and maximize learning efficiency without use of human instructors. The results of this study, as measured by both academic and job-simulated tests, support the feasibility of machine-teaching limited foreign language skills. The methodology developed has further possible application in foreign language teaching.

"Programming an Intensive Oral-Aural Language Course," by Eugene H. Rocklyn, paper for South-eastern Psychological Association meeting, Spring 1962 (CONTACT I).

"The Evaluation of Self-Instructional Foreign Language Courses," by Eugene H. Rocklyn, paper for National Society for Programmed Instruction meeting, San Antonio, April 1964.

"A Self-Instructional Program for Tonal Discrimination—Identification Lessons in Foreign Language Learning," by Eugene H. Rocklyn and Catherine Garvey, paper for National Society for Programmed Instruction meeting, San Antonio, April 1964.

A Self-Instructional Tactical Language Course in Russian, Eugene H. Rocklyn, Technical Report 65-14, December 1965 (CONTACT II). AD-626 262

To enable the combat soldier to obtain perishable, tactical information from newly captured prisoners of war, a brief, self-instructional Russian language course was developed and evaluated. Course content, based on questionnaires to combat-experienced personnel, covered areas of information likely to be used in any offensive or defensive questioning situation. The course was taken by 13 students who ranged from 0 to the 97th percentile on the Army Language Aptitude Test. They were tested on acquisition of course content and on ability to use the material to obtain information from native Russians during simulated combat-area questioning. They scored 93% in speaking and understanding Russian and 89% in translating answers given by the Russians, thus demonstrating the feasibility of such a course. The structure and questioning techniques seem effective in helping to elicit understandable answers from non-English-speaking personnel and may serve as a basis for development of similar courses in other languages.

CONTACT (Cont.)

Development and Evaluation of a Tactical Mandarin Chinese Language Course, by Catherine Garvey and Eugene H. Rocklyn, Technical Report 65-15, December 1965 (CONTACT III). AD-629 444

To meet the need for a short, self-instructional tactical language course in a Far Eastern tonal type language of potential military significance, a course in Mandarin Chinese was developed, by adapting the methods described in Sub-Unit CONTACT II with reference to a European type language (Russian). The purpose of the course was to enable combat soldiers to acquire perishable tactical information from newly captured POWs. The course was programed in the format of the Russian model with a major change in the addition of tone-discrimination and tone-production lessons. Six male students, high school seniors and graduates with varied language-learning aptitudes, took the course and completed it in 61 to 84 hours. Their final test scores, indicating ability to speak and understand all the assigned Chinese vocabulary, ranged from 55% to 98% correct. In a simulated questioning test, the mean percentage of correctly translated answers was 86%. Although low language-learning aptitude was associated with lower scores, the overall achievement appeared to be satisfactory.

"The Development and Test of a Special Purpose Foreign Language Training Concept," by Eugene H. Rocklyn, *International Review of Applied Linguistics*, vol. V, no. 1, March 1967.

See Technical Report 65-14 and Technical Report 65-15.

Research By-Products resulting from this research effort are listed in Part III.

CONTROL—Division No. 4

**Control in Small Infantry Units
(Research for the Department of the Army)**

Squad Performance as a Function of the Distribution of a Squad Radio, by James W. Dees, Technical Report 69-24, 48 pp., December 1969. AD-701 152

To determine the optimum radio distribution within the infantry squad, a three-phase squad tactical problem was conducted to test seven distributions of the radio and a no-radio control condition. Measures included times required to accomplish specific actions, and the rated effectiveness of the squad in accomplishing its assigned tasks. The radio provided a significant advantage under simulated enemy fire and/or limited visibility. The optimal radio distribution was two-way communication between platoon leader and squad leader. Additional receivers below the level of the squad leader neither helped nor hindered proficiency, but additional transmitters below this level deteriorated overall performance. The data on proficiency ratings were generally not significant.

COPE—Division No. 7 (Social Science)

**Development of a Method for Training Military Personnel for Interaction With Foreign Nationals
(Research for the Department of the Army)**

"The Development of Cultural Self-Awareness: Design of a Program of Instruction," by Alfred J. Kraemer, paper for NATO Conference, Brussels, Belgium, July 1969; issued as Professional Paper 27-69, 12 pp., August 1969. AD-694 505

In this paper the design of a training process for developing cultural self-awareness is described. Spontaneous interactions of Americans with foreigners in simulated on-the-job encounters are video-taped. Different behavioral manifestations of particular cognitions and their relation to American cultural premises and values are shown in sequences of video-taped excerpts used for training. The training is intended to enhance the effectiveness of U.S. personnel in overseas assignments.

"Development of a Technique for Creating 'Cultural Self-Awareness'," by Alfred J. Kraemer, paper for CONARC briefing, Fort Monroe, Va., July 1970; included in *HumRRO Research on Officer Training*, Professional Paper 24-70, 44 pp., September 1970.

CULTECH—Division No. 7 (Social Science)

**Technical Training Across Cultural Barriers
(Research for the Department of the Army)**

The Achievement of Foreign Students in U.S. Army Technical Schools, by George H. Brown, Technical Report 65-7, June 1965 (For Official Use Only). AD-483 332

The research objectives in this study were (a) to obtain information on the academic achievement of foreign students in selected Army technical schools, (b) to assess the relationship between English language proficiency and academic achievement, and (c) to describe the viewpoints and recommendations of U.S. instructors on the problems involved in training foreign personnel. Information was collected from the academic records maintained by the U.S. Army Engineer, Signal, Ordnance, and Transportation Schools and from a survey of instructors with experience in teaching foreign students. The data thus obtained form the basis for the findings and conclusions presented in this report. (U)

DECISION—Division No. 3

Factors Influencing Command and Tactical Decision Making (Research for the Department of the Army)

"Problems and Possibilities in the Use of Discussion for Organizational Decision Making," by Richard Snyder, paper for American Speech Association meeting, 1955.

This paper presents comments on some aspects of trends in research on "discussion," broadly defined as all processes of social communication that mediate group and organizational problem solving or decision making.

"The Influence of Cognitive Dissonance on Sequential Decisions," by Richard Snyder and Carl H. Rittenhouse, paper for Western Psychological Association meeting, 1957.

In Investigation of Flexibility in Tactical Decision Making, by Richard Snyder, Carl H. Rittenhouse, and George E. Deane, Staff Memorandum, December 1957. AD-480 316

Combat arms officers were given a tactical problem presented in stages; initial information strongly favored holding certain dominating terrain, while subsequent information favored withdrawal. Officers in a control group were required to make only a final decision. Data from the second of three experiments yielded significant relationships between the subjects' final decision and their scores on tests of tolerance for dissonance, and between the decisions and the subjects' military rank. In the third experiment, only the relationship with rank was significant. Interpretations of these contradictory findings and some implications for training are discussed.

DESERT ROCK I—Motivation, Morale, and Leadership Division

Factors Influencing Performance of Troops Exposed to an Atomic Shot (Research for the Department of the Army)

DESERT ROCK I: A Psychological Study of Troop Reactions to an Atomic Explosion, by Peter A. Bordes, John L. Finan, Joseph R. Hochstim, Howard H. McFann, and Shepard G. Schwartz, Technical Report 1, February 1953. AD-6 092

A major objective of this exercise was to evaluate psychologically the troops' reactions to the maneuver before indoctrination, after indoctrination, after the detonation, and after a lapse of about three weeks. Attitude research techniques as well as physiological measures were used to estimate (a) the effectiveness of the indoctrination procedures in increasing the troops' knowledge about atomic warfare and (b) the effects of the detonation, together with its accompanying consequences, on the troops' confidence in their ability to do well in A-bomb fighting.

DESERT ROCK I: A Psychological Study of Troop Reactions to an Atomic Explosion—Additional Data Related to Attrition, by Joseph R. Hochstim, Supplement to Technical Report 1, March 1953 (For Official Use Only).

DESERT ROCK IV—Motivation, Morale, and Leadership Division
Factors Influencing Performance of Troops Exposed to an Atomic Shot
(Research for the Department of the Army)

DESERT ROCK IV: Reactions of an Armored Infantry Battalion to an Atomic Bomb Maneuver, Technical Report 2, August 1953. AD-16 451

To study the psychological reactions of troops who witnessed the detonation of an atomic weapon as part of a field maneuver, armored infantry troops were stationed in trenches four miles from ground zero. Some of the men had received limited indoctrination and others were given a special four-hour indoctrination the day before the maneuver. The men were measured before and after indoctrination and after the maneuver to determine the amount and kind of information they had learned regarding atomic effects, the ways in which the two groups reacted during the exercise, and the nature and extent of their fears and their self-confidence. The extent to which participant troops disseminated information to nonparticipants after returning to their home station was also measured.

Characteristics of Troops With Varying Levels of Information About Atomic Effects - DESERT ROCK IV, Staff Memorandum, November 1953. AD-482 185

"Preparation of Soldiers for Atomic Maneuvers," by Shepard Schwartz and Berton Winograd, *Journal of Social Issues*, vol. 10, no. 3, 1954.

DESERT ROCK V—Division No. 3
Psychological Study of Troop Reactions at an Atomic Explosion¹
(Research for the Department of the Army)

DESERT ROCK V: Reactions of Troop Participants and Forward Volunteer Officer Groups to Atomic Exercises, by Benjamin W. White, Information Report, August 1953. AD-478 053

Questionnaires were administered to troops participating in an atomic test maneuver to ascertain what and how much the troops learned on these maneuvers and the degree to which the experience changed their attitudes toward atomic warfare. Reactions of volunteer officers who took forward positions during the test maneuvers were determined through interviews. Questionnaire and interview responses are reviewed in this report.

Spread of Information Following an Atomic Maneuver, by Richard Snyder and Eli Saltz, Information Report, February 1954. AD-482 183

This study investigated the effectiveness of word-of-mouth communication in spreading the information gained by three enlisted men who were observers at an atomic test explosion to other men of their home units. Questionnaire measures of information and attitudes about atomic effects, protective measures, and related topics were obtained from all battery members before the observers departed for the atomic test and again two weeks after they had returned. The observers' information and opinions were also measured at the end of their stay at the test site camp. As measured by the questionnaires, observer information gains were small, but there was considerable spread of information to the remaining members of the observers' units. Actively involving all members of home units in the advance preparation of observers produced important effects in increasing observers' information gains and in spreading information in the batteries.

¹ Related research is reported under Work Unit YUCCA.

DESERT ROCK V (Cont.)

Gain in Information in the DESERT ROCK A-Bomb Maneuvers, by Berton Winograd, Staff Memorandum, March 1954.¹ AD-482 184

Findings from HumRRO studies on three different DESERT ROCK atomic-bomb maneuvers have been organized around the subject of troops' information gain from indoctrination on atomic weapons and warfare. In all three studies, the indoctrinations were evidently pitched at such a level that they produced about the same effects among troops of varying backgrounds and attitudes. Men who learned a substantial number of facts from the indoctrination were more likely than other men to become self-confident and willing to volunteer for potentially hazardous duty.

"Communication and Leadership Roles," by Richard Snyder, paper for West Coast Society for Small Group Research meeting, April 1955.

A theoretical formulation of "group roles" as related to the abstract model of a group regarded solely as a communication structure is presented. A review of some research related to role functions in this theoretical context is also included.

"Group Participation and Informal Status of Source as Determinants of Spread of Information in Organizational Groups," by Richard Snyder, paper for American Psychological Association convention, September 1955.

Experiences at Desert Rock VIII, by Robert D. Baldwin, Staff Memorandum, March 1958.²

DRIVER EDUCATION—Division No. 1 (System Operations)

Development of Driver Education Objectives: A Driving Task Analysis
(Research for the Department of Transportation)

"Image Generation for Driving Simulators: Analysis of the Driving Task," by A. James McKnight, paper for Third Annuzi Human Factors Workshop in Highway Transportation, Washington, January 1970.

Description of the analysis of the driving task for the Department of Transportation. This task is to identify driving behaviors leading to the development of instructional objectives for driver education courses based on study of the driving system.

"The Development of Driver Education Objectives Through an Analysis of the Driving Task," by A. James McKnight and Bert B. Adams, paper for National Safety Congress, Chicago, October 1970; issued as Professional Paper 4-71, 14 pp., April 1971. PB-200 692

The ultimate goal of the research described in this paper is to develop a set of instructional objectives for driver education courses based on a comprehensive and detailed analysis of the driver's task. There are two phases—first, an analysis of the driver's tasks; second, a set of instructional objectives developed from results of the task analysis. The task analysis is described in this paper. It consists of three activities: (a) the analysis proper—reduction of the driver's tasks into their component behaviors, (b) a criticality evaluation—an attempt to assess the importance of each behavior to safe and efficient driving, and (c) the development of task descriptions—preparation of a booklet containing the results of the task analysis and a criticality evaluation.

¹This report, consolidating information from the DESERT ROCK I, IV, and V research studies, was prepared by the Motivation, Morale, and Leadership Division.

²This report, the final HumRRO report originating in the DESERT ROCK series of atomic bomb maneuvers by the Army, was prepared by Division No. 1.

DRIVER EDUCATION (Cont.)

Driver Education Task Analysis, Volume I: Task Descriptions, by A. James McKnight and Bert B. Adams, (HumRRO Technical Report 70-103), U.S. Department of Transportation Technical Report HS 800 367, DOT Contract No. FH 11-7336, 356 pp., November 1970. PB-197 325

This volume is the first of a four-volume report dealing with the development of driver education objectives through an analysis of the driver's task. It contains a detailed description of the behaviors required of passenger car drivers, rated criticalities of these behaviors, and items of supporting information relating to driver performance and performance limits, enabling driver knowledges and skills, and behavior criticality. The task descriptions have been organized in terms of the situations giving rise to the behaviors; behaviors involved in controlling movement of the car without regard to specific situations; behaviors that must be performed continuously or periodically while driving, rather than in response to a specific situation; and those off-road behaviors that are performed before driving, to maintain the car in sound operating condition, and in compliance with the legal regulations.

Driver Education Task Analysis, Volume II: Task Analysis Methods, by A. James McKnight and Bert B. Adams (HumRRO Interim Report IR-D1-70-1), U.S. Department of Transportation Technical Report HS 800 368, DOT Contract No. FH 11-7336, 44 pp., November 1970.

This report describes a method used to analyze and evaluate the criticality of driver behaviors. To assure comprehensive identification of driving behaviors, an analysis was made of the total highway transportation system including the driver, vehicle, roadway, traffic, and natural environment. Each aspect of the system was examined to identify specific situations that drivers encounter and the appropriate responses. The behaviors arising out of the systems analysis were organized into groups of related behaviors or "tasks". The analysis was continued to assure the identification of specific driving responses and associated cues. A group of 100 traffic safety experts, selected from among driver educators, enforcement officers, license officials, and fleet safety personnel, were asked to evaluate the criticality of the 1700 identified behaviors to the safety and efficiency of the highway transportation system. The driving behaviors, together with their associated criticality indices and various items of supporting information gained through a survey of the driving literature, were entered into a set of driving task descriptions.

Driver Education Task Analysis, Volume III: Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Technical Report 71-9), U.S. Department of Transportation Technical Report (in press), DOT Contract No. FH 11-7336, 351 pp., March 1971.

This report describes a set of instructional objectives for driver education courses, and an evaluation instrument for assessing the degree to which the objectives have been attained. The objectives are grouped into 74 learning units, each consisting of a statement of purpose, a list of performance objectives, and a description of enabling knowledge and skill objectives. The objectives are grouped into categories representing either major steps toward fulfilling the stated purpose, or groups of similar objectives, and are presented in sequence of normal occurrence. They are also grouped into five levels of criticality. The evaluation instrument comprises three separate tests—the Driving Fundamentals Test, Driving Situations Test, and Driving Knowledge Test.

Driver Education Task Analysis, Volume IV: The Development of Instructional Objectives, by A. James McKnight and Alan G. Hundt, (HumRRO Interim Report IR-D1-71-1), Department of Transportation Technical Report (in press), DOT Contract No. 11-7336, 68 pp., March 1971.

This report describes the methods that were used to develop for driver education courses a set of instructional objectives and an evaluation instrument to measure their attainment, based upon the results of a driving task analysis conducted earlier. Driving behaviors considered critical enough to be required of all drivers were organized into a set of performance objectives and accompanying performance standards. A set of enabling objectives, describing the skills and knowledges required in carrying out performance objectives, was also prepared. The evaluation instrument was composed of three tests: a Driving Fundamentals Test, a Driving Situations Test, and a Driving Knowledge Test. All tests were pilot-tested at a neighboring high school to establish their feasibility of administration.

ECHO—Division No. 6 (Aviation)
Synthetic Flight Training Programs and Devices
(Research for the Department of the Army)

"The Importance of Training Requirements Information in the Design and Use of Aviation Training Devices," by Wallace W. Prophet, paper for 16th Annual International Air Safety Seminar, Athens, Greece, November 1963; issued as Professional Paper 8-66, 9 pp., December 1966. AD-645 961

Too often people in education and training tend to forget that a simulator does not train; the training program trains. The simulator is potentially one of the most useful tools for training, but it is just that—a tool for the training program. The best sequence of procedures for new devices and training programs is examined. The presentation includes examples of psychologists applying their skills to development of training devices and working with engineers to produce the best simulator for the particular purpose.

"Reduction of Helicopter Pilot Attrition Through Synthetic Contact Flight Training," by Paul W. Caro, Jr., paper for American Psychological Association convention, Chicago, September 1965 (ECHO II).

The reduction of flight attrition in primary helicopter training through the use of a synthetic contact flight training device is described. The device, a one-man helicopter mounted on a ground effects machine through an articulated linkage which allows freedom of movement in six dimensions, preserves the handling characteristics and visual, auditory, and proprioceptive cues of the in-flight task. Two experimental groups received 3¼ or 7¼ hours device training, and their attrition rates during subsequent flight training were compared to that of controls. The synthetic training groups experienced lower attrition ($p < .01$) than the controls. No significant difference existed between experimental groups.

"Changes in Flight Trainee Performance Following Synthetic Helicopter Flight Training," by Paul W. Caro, Jr., and Robert N. Isley, paper for Southeastern Psychological Association meeting, New Orleans, La., April 1966; issued as Professional Paper 1-66, 13 pp., April 1966 (ECHO II). AD-630 484 ED-015 422

Research was conducted to determine whether student performance on helicopter contact flight training could be improved with the use of a helicopter training device. Four groups of subjects, two experimental and two control, were used. Results showed that the experimental subjects acquired the necessary skills with less inflight training during the Pre-Solo phase of training. The most significant improvement occurred in the reduction in elimination rates during subsequent flight training.

"Helicopter Trainee Performance Following Synthetic Flight Training," by Paul W. Caro, Jr., and Robert N. Isley, *Journal of the American Helicopter Society*, vol. 11, no. 3, July 1966; issued as Professional Paper 7-66, 16 pp., November 1966 (ECHO II). AD-646 157

Two groups of trainees at the U.S. Army Primary Helicopter School were trained to "fly" a captive helicopter mounted on a ground effects machine. The device had the approximate handling characteristics of a free-flying vehicle, yet it allowed the trainees to obtain "aeronautical experience" not otherwise possible at their level of training. It was found that the device-trained subjects, when compared with non-device-trained controls, were significantly less likely to be eliminated from subsequent primary helicopter training for reasons of flight skills deficiency. Further, measures of relative performance during primary flight training indicated the device-trained group solved the helicopter earlier and made better flight grades during the pre-solo phase of training than did the controls.

"Helicopter Training Devices in Support of Army Aviation," by Paul W. Caro, Jr., paper for symposium at annual meeting of Southeastern Psychological Association, Atlanta, Ga., April 1967; included in *Human Factors Research in Support of Army Aviation*, Professional Paper 27-67, June 1967.

ECHO (Cont.)

"Human Factors in Aviation: Some Recurrent Problems and New Approaches," by Wallace W. Prophet, paper for Alabama Psychological Association meeting, Mobile, Ala., May 1967; issued as Professional Paper 30-67, 20 pp., June 1967. AD-656 971

Three areas of human factors concern in aviation—performance assessment, prediction of performance, and simulation in training—are discussed. Emphasis is placed on the necessity for providing objective and standardized evaluation of flight trainees, rather than using the unreliable subjective evaluation methods. Methods for predicting trainees' performance, particularly in combat situations, are being sought. Use of simulation in training helicopter pilots has been minimal, but recently two devices have been developed to provide better transfer of training from the device to the actual helicopter situation.

"Inflight Performance After Zero, Ten, or Twenty Hours of Synthetic Instrument Flight Training," by Robert N. Isley, paper for Alabama Psychological Association meeting, Birmingham, Ala., May 1968; issued as Professional Paper 23-68, 16 pp., June 1968 (ECHO IV). AD-675 379

Three groups of Warrant Officer Candidates, enrolled in the Tactical Instrument Phase of the Officer/Warrant Officer Rotary Wing Aviator Course, were given zero, 10, or 20 hours of synthetic instrument flight training in Device 1-CA-1. End-of-phase flight proficiency measures were obtained from photographic records of the aircraft instrument panel taken during a hypothetical tactical instrument mission. The results indicated generally that there were no significant differences in flight performance among the three groups in terms of the relative incidence of aircraft control and procedural errors. It is concluded that synthetic device training, as given during the conduct of this study, has little, if any, measurable effect on end-of-phase flight performance.

The Captive Helicopter as a Training Device: Experimental Evaluation of a Concept, by Paul W. Caro, Jr., Robert N. Isley, and Oran B. Jolley, Technical Report 68-9, 47 pp., June 1968. AD-673 436

The research objective was to determine the effectiveness of a new device concept for helicopter contact flight training and the usefulness of such a device for predicting performance during subsequent flight training. The device was a commercially available captive helicopter attached to a ground effects machine. Two experimental groups of trainees received 3¼ or 7¼ hours of device training prior to primary helicopter training. In comparison with control groups, both device trained groups (a) were significantly less likely to be eliminated from subsequent flight training for reasons of flying deficiency; (b) required less flight training to attain the proficiency required to solo the helicopter; and (c) received higher grades during early training. Trainees who performed well on the training device tended to perform well during subsequent flight training. Instructors using devices such as this one need not be proficient in the helicopter used for subsequent flight training.

Evaluation of Synthetic Instrument Flight Training in the Officer/Warrant Officer Rotary Wing Aviator Course, by Robert N. Isley, Paul W. Caro, Jr., and Oran B. Jolley, Technical Report 68-14, 43 pp., November 1968 (ECHO III). AD-680 586

The objective was to determine the training value of synthetic instrument flight training given in the Tactical Instrument Phase of the Army's Officer/Warrant Officer Rotary Wing Aviator Course. Synthetic training in that course is administered in a modified fixed wing instrument training device. One group of trainees received the standard 20-hour synthetic instrument flight training program, a second group received 10 hours, and a third group received no synthetic training. The synthetic training given in the modified fixed wing training device did not increase trainee helicopter instrument flight proficiency in terms of aircraft control and procedural skills. In addition, there were no significant differences among the three groups in attrition, instructor-assigned daily grades, amount of flight instructional time required to complete the phase, and final checkride grades.

ECHO (Cont.)

"Use of Time-Lapse Photography in Flight Performance Evaluation," by Robert N. Isley and Paul W. Caro, Jr., *Journal of Applied Psychology*, vol. 54, no. 1, February 1970; issued as Professional Paper 10-70, 7 pp., April 1970 (ECHO III). AD-716 726

A time-lapse photographic technique for recording and scoring the inflight performance of helicopter aviator trainees during a hypothetical tactical instrument mission is described. Data were derived from 16-mm films of the instrument panel readings of the TH-13T helicopter. Advantages, disadvantages, and other possible applications of the film technique are also discussed.

A Determination of Selected Costs of Flight and Synthetic Flight Training, by Oran B. Jolley and Paul W. Caro, Jr., Technical Report 70-6, 42 pp., April 1970 (ECHO III). AD-706 764 ED-042 952

This report is concerned with identifying and computing costs associated with the conduct of flight and synthetic training in the instrument phase of the Army's Officer/Warrant Officer Rotary Wing Aviator Course. The report describes the sources for and the treatment of data, and the major assumptions made in allocating the costs. Other applications of the information are discussed.

Equipment-Device Task Commonality Analysis and Transfer of Training, by Paul W. Caro, Technical Report 70-7, 34 pp., June 1970 (ECHO IV). AD-709 534 ED-043 833

This is a report on procedures developed to determine the potential uses of training devices for missions in operational equipment. The procedures are designed in connection with an Army rotary wing instrument flight training program.

Research By-Products resulting from this research effort are listed in Part III.